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ABSTRACT

The purpose of this study was to collect "bench mark" data on the teaching of science that could serve as a basis of comparison for trend analysis. The information obtained in this survey presents a description of science teaching practices and selected science teacher characteristics in the United States. Descriptive information obtained in the survey is organized into four sections: (1) introduction, development of questionnaires, sampling procedure, and response to questionnaires; (2) school organization and schedules, financial support, homogeneous grouping, the science curriculum in public secondary schools, science course improvement projects, environmental education, science clubs and fairs, supervisors and consultants, and in-service education; (3) personal characteristics of teachers, teaching assignments, special facilities for science courses, types of science classrooms, ranking of importance of learning activities and grading methods, employment status of teachers, evaluation of factors needed for high quality science programs, and satisfaction with science teaching as a career; and (4) summary and discussion. Appendices include the principal's questionnaire and the science teacher's questionnaire. A second volume in this series will present correlation and multiple regression analyses of this data. (DT)

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A SURVEY OF SCIENCE TEACHING IN PUBLIC SCHOOLS OF THE UNITED STATES (1971)

VOLUME 1–SECONDARY SCHOOLS

By Fred R. Schlesinger
Robert W. Howe
Arthur L. White
Long Fay Chin
James H. Baker
Ellen C. Buckeridge

CENTER FOR SCIENCE AND MATHEMATICS EDUCATION
THE OHIO STATE UNIVERSITY
In cooperation with
the ERIC Science, Mathematics and Environmental Education Clearinghouse

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SCIENCE EDUCATION REPORTS

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Preface

The purpose of this study was to collect "bench mark" data on the teaching of science that could serve as a basis of comparison for trend analysis. The information obtained in this survey provides a description of science teaching practices and selected science teacher characteristics in the United States. Comparisons with data to be obtained in future studies will help decision makers regarding changes taking place in programs, instruction, facilities, and teacher education.

This monograph provides descriptive information obtained in the survey. A second volume will present correlation and multiple regression analyses. Similar monographs are being released regarding the teaching of elementary science.

This trend analysis project will be continued by another national survey that will be conducted during the 1974-75 school year. We have used information obtained in the 1970-71 survey to answer many requests for information at ERIC/SMEAC and believe there is interest and need for similar information collected on a periodic basis.

The authors are grateful for assistance provided by Sue Helgeson, Peggy Steiner, Barbara Mackey, and Edith Santana. Mrs. Santana provided considerable assistance in preparing the final report.

Robert W. Howe
Director
ERIC/SMEAC

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Section I

Introduction

The purpose of the National Survey was to obtain information about practices, procedures, policies and conditions affecting science education in the public secondary schools during the 1970-71 school year. The study involved both the development of questionnaires to ascertain the status of science teaching and the multi-stage random sampling of public secondary schools, science teachers and science classes. Two questionnaires were designed, and after a pilot study with resulting revision, they were used in the study.

Development of Questionnaires

The Principal's Questionnaire

This instrument was designed to provide summative data for all the science teachers, science classes, and science programs in the school. The questionnaire had twenty-six items grouped into seven sections. The sections included: (1) screening questions, (2) school organization and scheduling, (3) grouping of science classes, (4) teaching staff, (5) science budget, (6) course offerings, and (7) miscellaneous. In all there were 141 variables in the principal's questionnaire. A copy of the questionnaire is included in Appendix A.

The Science Teacher's Questionnaire

The teacher's questionnaire was designed to obtain data on the characteristics of public secondary school science teachers, and specific practices and conditions related to science instruction. The instrument contained twenty-one items grouped into six sections. The sections included : (1) school organization, (2) teacher characteristics, (3) teaching load, (4) special facilities and audio-visual aids, (5) science teaching, and (6) miscellaneous. A total of 135 variables were included in this instrument. A copy of the questionnaire is included in Appendix B.

Sampling Procedure

The population consisted of all public secondary schools in the United States that were listed in the state education directories for the 1969-70 school year. The number of secondary schools sampled was 6,398, or approximately 25 per cent of the schools listed in the state directories. The sample population of schools from each state is shown in Figure 1, p. 2.

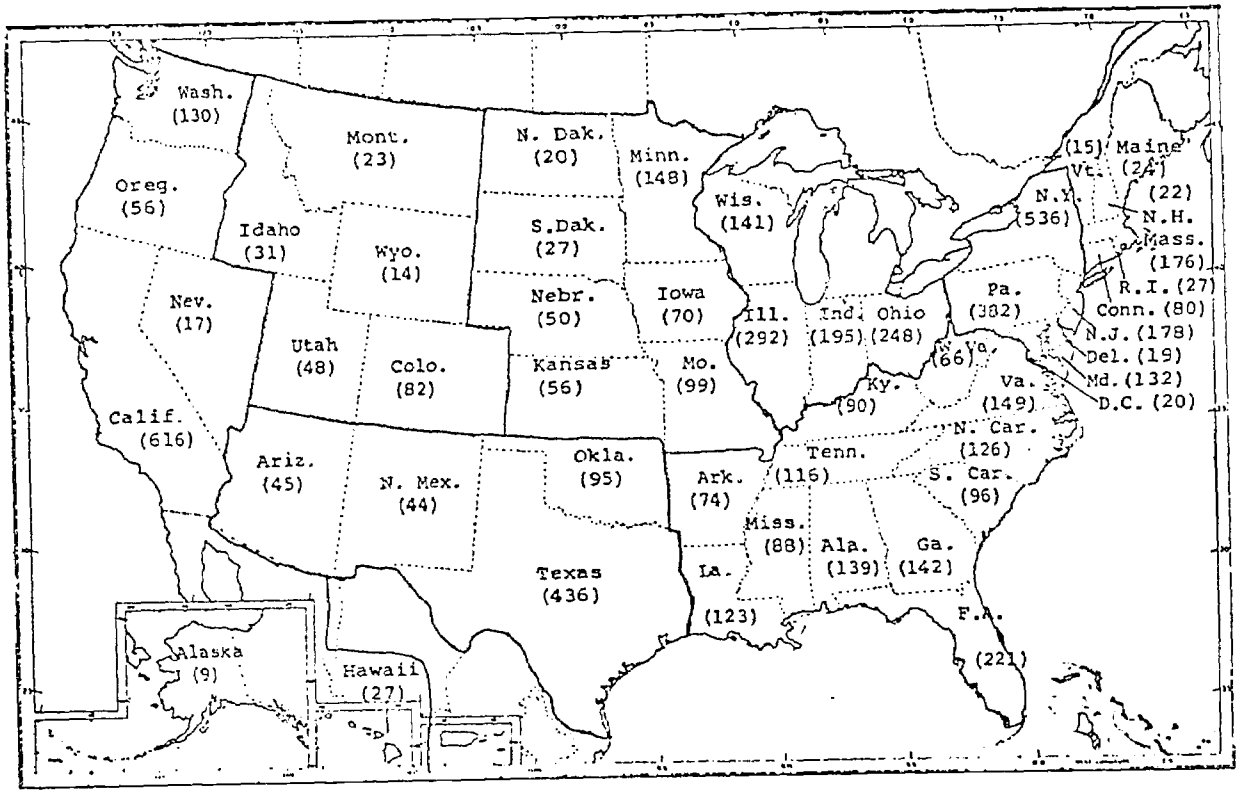


Figure 1. Number of Public Secondary Schools Sampled Per State. Total Sample Size = 6398 Schools.

The states were grouped into eight regions for comparative purposes. These regions were New England, Mideast, Great Lakes, Southeast, Plains, Rocky Mountains, Southwest and Farwest. States included in the regions are shown in Figure 2, p. 4.

The sampling design within each state involved three stages:

1. Stratified random selection of secondary schools.

2. Random selection of secondary science teachers within the selected schools.

3. Random selection of science classes for the selected teachers.

Selection of the Public Secondary Schools

The method of obtaining the sample of public secondary schools involved the following steps:

1. The number of public secondary schools selected from each state and the District of Columbia was computed on the basis of the ratio of the state or District of Columbia total secondary school enrollment to the total U.S. secondary school enrollment. Thus,

$$n_{state} = \frac{N_{state(S)}}{N_{total(S)}} \times N$$

where n_{state} = number of public secondary schools sampled in the state

$N_{state(S)}$ = secondary school enrollment in the state

$N_{total(S)}$ = total U.S. secondary school enrollment

N = sample size = 6,398 public secondary schools.

Example: State of Ohio

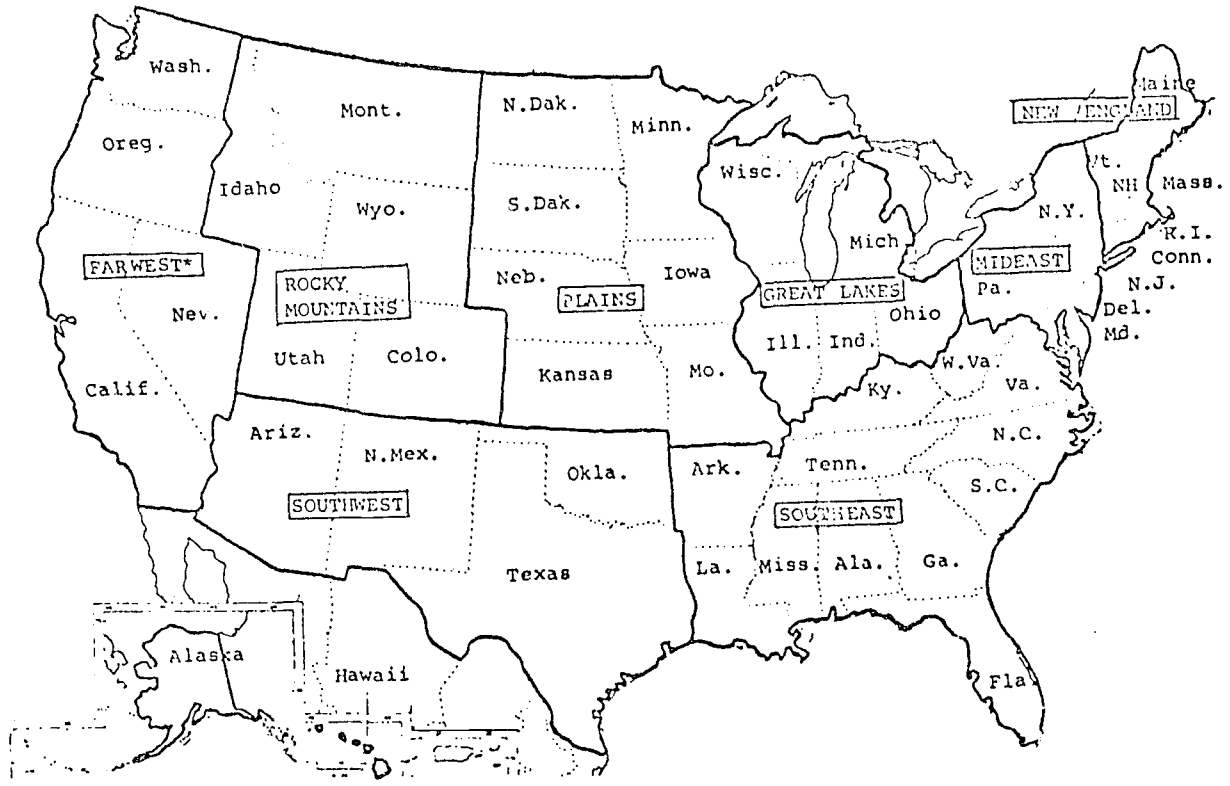
$N_{Ohio(S)}$ = 680,960 secondary school students

$N_{total(S)}$ = 17,543,239 secondary school students

Hence, $n_{Ohio} = \frac{680,960}{17,543,239} \times 6,398$

= 248 public secondary schools.

i.e. 248 public secondary schools were sampled from the population of public secondary schools in Ohio.



New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
Connecticut	Delaware	Illinois	Alabama	Iowa	Colorado	Arizona	Alaska
Maine	Dist. Columbia	Indiana	Arkansas	Kansas	Idaho	New Mexico	California
Massachusetts	Maryland	Michigan	Florida	Minnesota	Montana	Oklahoma	Hawaii
New Hampshire	New Jersey	Ohio	Georgia	Missouri	Utah	Texas	Nevada
Rhode Island	New York	Wisconsin	Kentucky	Nebraska	Wyoming		Oregon
Vermont	Pennsylvania		Louisiana	North Dakota			Washington
			Mississippi	South Dakota			
			North Carolina				
			South Carolina				
			Tennessee				
			West Virginia				
			Virginia				

Figure 2. State Groupings (Geographic Regions) Used in the Study.

*Includes Alaska and Hawaii

2. The unit population for each state and the District of Columbia was computed as follows:

$$\text{Unit population} = \frac{N_{\text{state (E,S)}}}{n_{\text{state}}}$$

where $N_{\text{state(E,S)}}$ = school enrollment (elementary and secondary) for the state.

Example: State of Ohio

$N_{\text{Ohio(E,S)}}$ = 2,384,160 students

n_{Ohio} = 248 public secondary schools

Hence, the unit population for Ohio

$$= \frac{2,384,160}{248}$$

= 9,613 students per public secondary school sample unit.

3. School districts in each state were first grouped by county. The total school enrollment (elementary and secondary) of all school districts in a county was computed. This number was divided by the unit population for that state to determine the number of public secondary schools to be sampled from the county. An example will be used with Franklin County, Ohio.

Example: Franklin County, Ohio

Total school enrollment in Franklin County = 177,707

Unit population for Ohio = 9,613

Number of public secondary schools to be sampled from the population of public secondary schools in Franklin County, Ohio

$$= \frac{177,707}{9,613} = 18$$

4. If the total school enrollment in a county was less than one half that of the unit population, then the county was combined with one or more neighboring county(ies) so as to give a combined school enrollment approximately equal to one, two or more times the unit population. Then the number of public secondary schools to be sampled from this group of counties was determined by dividing the combined school enrollment by the unit population. An example will be used with Coshocton and Holmes Counties, Ohio.

Example: Combining Neighboring Counties - Coshocton and Holmes Counties, Ohio

Total school enrollment in Coshocton County = 7790 students.
Total school enrollment in Holmes County = 4343 students.
Combined school enrollment in Coshocton and Holmes Counties = 12,133 students.
Number of public secondary schools to be sampled in Coshocton and Holmes Counties = $\frac{12,133}{9,613}$

= 1, to the nearest whole number.

5. In the case of large school districts within a county, the total school enrollment in each school district is divided by the unit population to determine the number of public secondary schools to be sampled from each district. An example will be used with the Columbus Public School District in Franklin County, Ohio.

Example: Columbus Public School District

Total school enrollment in the Columbus Public School District = 105,123 students.
Number of public secondary schools to be sampled from this school district = $\frac{105,123}{9,613}$ = 11, to the nearest whole number.

6. In the case of small school districts within a county, two or more neighboring districts were combined, and their total school enrollment was divided by the unit population to determine the number of public secondary schools to be sampled in the combined districts. An example will be used with the Grandview Heights and Upper Arlington School Districts in Franklin County, Ohio.

Example: Combining School Districts - Grandview Heights and Upper Arlington, Franklin County, Ohio

Total school enrollment in the Grandview Heights School District = 1,768 students.
Total school enrollment in the Upper Arlington School District = 8,487 students.
Combined school enrollment = 10,255 students.
Number of public secondary schools to be sampled from the Grandview Heights and Upper Arlington school districts = $\frac{10,255}{9,613}$ = 1, to the nearest whole number.

7. The individual public secondary schools were then randomly selected from an alphabetical listing of all public secondary schools in the selected school district or a combination of

school districts. Tables of random numbers were used in this phase of the sampling. The principals of selected public secondary schools received the Principal's Questionnaire.

Selection of Science Teachers

Along with the Principal's Questionnaire, the principal of a selected school received directions for randomly selecting a science teacher on his teaching staff to respond to the Science Teacher Questionnaire.

The science teacher was chosen on the basis of a set of selection criteria associated with a set of selection numbers generated specifically for each school from a random numbers table. The principal was requested to (1) list in alphabetical order the last names of all teachers in his school who taught at least one science class or subject in any grade level from 7 through 12, and (2) select a science teacher on the alphabetical list, using a given set of selection criteria. (For an example of a set of science teacher selection criteria, see Appendix C).

Selection of Science Classes

The selected science teacher was requested to respond to all items concerning science teaching practices in the Science Teacher Questionnaire with reference to one of his science classes selected randomly. The method of randomly selecting a science class was as follows:

1. The science teacher was requested to list his science classes in order, starting with the first science class that he taught each day, and ending with his last science class each day.

2. He was then requested to select one of his science classes on the basis of selection criteria associated with a set of selection numbers generated specifically for each teacher from a table of random numbers.

Response to Questionnaires

After the original mailing of letters and questionnaires, post cards, letters, and phone calls were used to follow-up non-responders at suitable intervals. Because of problems in many city schools in the spring of 1971, a number of schools in the sample requested not to be included in the study. The resulting returns are shown in Table 1, page 8. Communications were received from a teacher or a principal from approximately 95 per cent of the schools.

Questionnaires from 2,489 principals and from 2,467 teachers were selected for use in these analyses.

Questionnaires lacking a considerable amount of data were not selected for analysis. Questionnaires that were found to have several errors were not selected for this analysis.

TABLE 1

NUMBER OF PUBLIC SECONDARY SCHOOLS SAMPLED, FREQUENCY DISTRIBUTION OF RESPONSES AND QUESTIONNAIRES USED IN THE ANALYSIS BY REGIONS

	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest	U.S. Total
Calculated Sample (1)	343	1267	1214	1430	470	198	621	855	6,398
Actual Sample (2)	336	1228	1214	1405	471	201	588	855	6,298
Total Responses (3)	306	1103	1197	1367	469	199	530	822	5,993
Principal's Questionnaires Used in Analysis	139	475	531	429	256	102	199	358	2,489
Teacher's Questionnaires Used in Analysis	143	518	468	414	249	101	202	372	2,467

Note (1) Calculated by method shown on page 4.
(2) Number of schools randomly selected at county and district level.
(3) All responses from schools (letters, partially complete & completed questionnaires - at least one response from a school).

Effect of Non-response and Incomplete Questionnaires on Analysis

Several analyses were conducted to determine the possible effect of non-responses and the removal of questionnaires from the analyses.

Analyses were conducted to determine which schools did or did not respond and the possible impact of those schools on the analyses. The analyses were conducted in three ways: (1) determining whether non-responding schools differed from those that did respond regarding school size, school location, and type of school; (2) analyzing principal and teacher returns from schools with a single response to compare data from those with two responses; and (3) checking non-responding schools in detail in two states (Ohio and Oregon) and a sample of 30 other schools from other states.

Analyses of data by regions indicated no significant differences using X^2 (.05 level) between non-responders and responders on items checked. Analyses of non-responders in two states and a sample of 30 schools selected from other states indicated non-responders would have little if any impact on the regional data. Data for small states would change, but these changes would not have substantial impact on regional or national data.

Section II

School Organization

Only public secondary schools were sampled for the study. Table 2, p. 10, presents data regarding types of schools in the analysis. Of the 2,489 secondary schools analyzed, 36.4 per cent were four-year high schools. Three-year high schools made up 24.1 per cent, while junior high schools were only 18.1 per cent of the total. Six-year secondary schools were found in 10.4 per cent of the cases. All other types of schools made up the remaining 10.1 per cent.

Schools with all grade levels, from kindergarten or first grade through the twelfth grade are decreasing and are few in number across the country. These data indicate that the "middle school" concept has not made much gain at this time.

TABLE 2

FREQUENCY DISTRIBUTION OF THE SAMPLE OF PUBLIC SECONDARY SCHOOLS BY REGIONS AND BY TYPE OF SCHOOL ORGANIZATION

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Type of School by Grades	N = 139		N = 475		N = 531		N = 429		N = 256		N = 102		N = 199		N = 358		N = 2489	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
K-12			5	1.1	6	1.1	4	0.9	2	0.8	4	3.9					21	0.8
1-12					2	0.4	11	2.6			1	1.0			2	0.5	16	0.6
7-12	9	6.5	69	14.5	41	7.7	51	11.9	62	24.2	7	6.9	15	7.5	6	1.7	260	10.4
8-12	3	2.2	7	1.5	2	0.4	31	7.2	1	0.4			1	0.5			45	1.8
9-12	80	57.6	142	29.9	267	50.3	104	24.2	52	20.3	11	10.8	86	43.2	164	45.8	906	36.4
10-12	39	28.0	101	21.3	126	23.7	72	16.8	59	23.0	31	30.4	47	23.6	124	34.6	599	24.1
7-8	2	1.4	14	2.9	9	1.7	19	4.4	11	4.3	5	4.9	9	4.5	6	1.7	75	3.0
7-9	5	3.6	116	24.4	63	11.9	95	22.1	64	25.0	40	39.2	37	18.6	50	14.0	470	18.9
Other	1	0.7	21	4.4	15	2.8	42	9.8	5	2.0	3	2.9	4	2.0	6	1.7	97	3.9
Total	139	100.0	475	100.0	531	100.0	429	99.9	256	100.0	102	100.0	199	99.9	358	100.0	2489	99.9

Junior high schools were most common in the Mideast. Enrollment in grades seven through twelve are shown in Tables 3 through 8, p. 11 to 13, with total enrollments on Table 9, p. 14. The relatively lower numbers of schools having seventh grades (856) and eighth grades (914) as compared to ninth grades (1705) reflects the large number of elementary schools of the K-8 and 1-8 type. A comparable study of elementary science education programs will include K-8 and 1-8 schools. The numbers of schools with grades nine through twelve were nearly constant in the population sample.

TABLE 3

FREQUENCY DISTRIBUTION OF SEVENTH GRADE STUDENT ENROLLMENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 16		N = 209		N = 132		N = 194		N = 130		N = 55		N = 59		N = 61		N = 856	
Student Enrollments	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
99 or less			14	6.7	38	28.8	42	21.6	40	30.8	8	14.5	13	22.0	2	3.3	157	18.3
100-199	6	37.5	44	21.1	17	12.9	30	15.5	23	17.7	10	18.2	4	6.8	7	11.5	141	16.5
200-299	5	31.3	52	24.9	26	19.7	40	20.6	23	17.7	17	30.9	16	27.1	7	11.5	186	21.7
300-399	3	18.8	31	14.8	23	17.4	35	18.0	23	17.7	10	18.2	11	18.6	11	18.0	147	17.2
400-499	1	6.2	35	16.7	22	16.7	28	14.4	15	11.5	10	18.2	7	11.9	15	24.6	133	15.5
500-599			14	6.7	4	3.0	11	5.7	3	2.3			4	6.8	3	4.9	39	4.6
600-699	1	6.2	10	4.8	1	0.7	3	1.5	2	1.5			2	3.4	10	16.4	29	3.4
700-799			5	2.4	1	0.7	3	1.5					1	1.7	5	8.2	15	1.8
800-up			4	1.9			2	1.0	1	0.8			1	1.7	1	1.6	9	1.0
Totals	16	100.0	209	100.0	132	99.9	194	99.8	130	100.0	55	100.0	59	100.0	61	100.0	856	100.0
Total Students	4,079		67,630		32,372		55,847		30,221		13,976		17,070		26,210		247,405	

TABLE 4

FREQUENCY DISTRIBUTION OF EIGHTH GRADE STUDENT ENROLLMENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 18		N = 214		N = 136		N = 233		N = 131		N = 56		N = 62		N = 64		N = 914	
Student Enrollments	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
99 or less			15	7.0	36	26.5	43	18.5	38	29.0	6	10.7	14	22.6	2	3.1	154	16.8
100-199	8	44.4	49	22.9	19	14.0	40	17.2	25	19.1	10	17.9	7	11.3	8	12.5	166	18.2
200-299	2	11.1	54	25.2	26	19.1	52	22.3	21	16.0	19	33.9	14	22.6	7	10.9	195	21.3
300-399	5	27.8	34	15.9	27	19.9	47	20.1	26	19.8	12	21.4	14	22.6	14	21.9	179	19.6
400-499	1	5.6	29	13.6	16	11.8	25	10.7	12	9.2	8	14.3	5	8.1	11	17.2	107	11.7
500-599	2	11.1	14	6.5	7	5.1	15	6.4	4	3.1			4	6.4	5	7.8	51	5.6
600-699			8	3.7	4	2.9	4	1.7	2	1.5			3	4.8	9	14.0	30	3.3
700-799			4	1.9	1	0.7	2	0.9					1	1.6	3	4.7	11	1.2
800-899			5	2.3			2	0.9	1	0.8	1	1.8			3	4.7	12	1.3
900-999							1	0.4									1	0.1
1000-up			2	0.9			2	0.9	2	1.5					2	3.1	8	0.9
Totals	18	100.0	214	99.9	136	100.0	233	100.0	131	100.0	56	100.0	52	100.0	64	99.9	914	100.0
Total Students	5,001		68,778		34,579		67,642		33,356		14,069		17,278		26,691		267,394	

TABLE 5

FREQUENCY DISTRIBUTION OF NINTH GRADE STUDENT ENROLLMENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 93		N = 325		N = 383		N = 311		N = 177		N = 61		N = 138		N = 217		N = 1705	
Student Enrollment	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
99 or less	2	2.2	22	6.8	52	13.6	40	12.9	62	35.0	12	19.7	31	22.5	2	0.9	223	13.1
100-199	14	15.0	56	17.2	59	15.4	71	22.8	38	21.5	9	14.8	15	10.9	20	9.2	282	16.5
200-299	22	23.6	82	25.2	65	17.0	77	24.7	25	14.1	18	29.5	25	18.1	23	10.6	337	19.8
300-399	21	22.6	55	16.9	65	17.0	50	16.1	26	14.7	14	22.9	22	15.9	39	18.0	292	17.1
400-499	17	18.3	47	14.5	47	12.3	42	13.5	12	6.8	5	8.2	7	5.1	50	23.0	227	13.3
500-599	6	6.4	29	8.9	34	8.9	13	4.2	6	3.4	2	3.3	14	10.1	31	14.3	135	7.9
600-699	4	4.3	14	4.3	25	6.5	8	2.6	1	0.6	1	1.6	14	10.1	34	15.6	101	5.9
700-799	3	3.2	7	2.2	17	4.4	3	1.0	1	0.6			4	2.9	9	4.1	44	2.6
800-899	2	2.2	3	0.8	11	2.9	2	0.6	2	1.1			4	2.9	3	1.4	27	1.6
900-999	1	1.1	3	0.8	4	1.0	3	1.0					1	0.7	2	0.9	14	0.8
1000-up	1	1.1	7	2.2	4	1.0	2	0.6	4	2.2			1	0.7	4	2.0	23	1.3
Totals	93	100.0	325	99.8	383	100.0	311	100.0	177	100.0	61	100.0	138	99.9	217	100.0	1705	99.9
Total Students	35,043		114,448		136,820		88,292		41,064		14,590		45,963		95,819		573,039	

TABLE 6

FREQUENCY DISTRIBUTION OF TENTH GRADE STUDENT ENROLLMENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 123		N = 304		N = 430		N = 261		N = 168		N = 51		N = 146		N = 281		N = 1764	
Student Enrollments	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
99 or less	1	0.8	21	6.9	51	11.9	37	14.2	61	36.3	11	21.6	32	21.9	3	1.1	217	12.3
100-199	15	12.2	47	15.5	61	14.2	69	26.4	36	21.4	6	11.8	18	12.3	20	7.1	272	15.4
200-299	30	24.4	55	18.1	66	15.3	44	16.9	19	11.3	7	13.7	20	13.7	27	9.6	268	15.2
300-399	24	19.5	45	14.8	58	13.4	44	16.9	10	6.0	7	13.7	12	8.2	32	11.4	232	13.2
400-499	16	13.0	38	12.5	48	11.2	22	8.4	12	7.1	5	9.8	13	8.9	56	19.9	210	11.9
500-599	17	13.8	28	9.2	49	11.4	15	5.7	10	6.0	5	9.8	14	9.6	55	19.6	193	10.9
600-699	10	8.1	20	6.6	33	7.7	15	5.7	4	2.4	3	5.9	13	8.9	40	14.2	138	7.8
700-799	5	4.1	15	4.9	27	6.3	2	0.8	5	2.9	4	7.8	12	8.2	12	4.3	82	4.6
800-899	2	1.6	11	3.6	19	4.4	6	2.3	4	2.4	3	5.9	8	5.3	10	3.6	63	3.6
900-999	1	0.8	1	0.3	9	2.1	2	0.8	2	1.2			3	2.1	10	3.6	28	1.4
1000-up	2	1.6	23	7.6	9	2.1	5	1.9	5	2.9			1	0.7	16	5.6	61	3.5
Totals	123	99.9	304	100.0	430	100.0	261	100.0	168	99.9	51	100.0	146	99.8	281	100.0	1764	99.8
Total Students	49,464		133,249		171,356		81,272		45,433		17,742		55,314		145,035		698,865	

TABLE 7

FREQUENCY DISTRIBUTION OF ELEVENTH GRADE STUDENT ENROLLMENTS BY REGIONS

Student Enrollments	New England N = 121		Mideast N = 307		Great Lakes N = 426		Southeast N = 259		Plains N = 189		Rocky Mountains N = 54		Southwest N = 146		Farwest N = 279		Total U.S. N = 1781	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
99 or less	1	0.8	21	6.8	51	12.0	48	18.5	83	43.9	15	27.8	31	21.2	2	0.7	252	14.1
100-199	15	12.4	63	20.5	66	15.5	69	26.6	35	18.5	5	9.3	24	16.4	24	8.6	301	16.9
200-299	32	26.4	51	16.6	72	16.9	54	20.8	23	12.2	8	14.8	18	12.3	29	10.4	287	16.1
300-399	25	20.7	46	15.0	68	16.0	36	13.9	10	5.3	5	9.3	16	11.0	40	14.3	246	13.8
400-499	21	17.4	38	12.4	55	12.9	17	6.6	13	6.9	6	11.1	10	6.8	54	19.4	214	12.0
500-599	11	9.1	25	8.1	40	9.4	14	5.4	6	3.2	5	9.3	16	11.0	60	21.5	177	9.9
600-699	9	7.4	25	8.1	34	8.0	8	3.1	8	4.2	6	11.1	14	9.6	30	10.8	134	7.5
700-799	6	5.0	12	3.9	10	2.3	4	1.5	2	1.1	2	3.7	11	7.5	12	4.3	59	3.3
800-899			6	2.0	16	3.7	5	1.9	3	1.6	1	1.8	6	4.1	10	3.6	47	2.6
900-999			5	1.6	12	2.8	1	0.4	1	0.5	1	1.8			4	1.4	24	1.3
1000-up	1	0.8	15	4.9	2	0.5	3	1.2	5	2.6					14	5.0	40	2.2
Totals	121	100.0	307	99.9	426	100.0	259	99.9	189	100.0	54	100.0	146	99.9	279	100.0	1781	99.7
Total Students	45,459		124,239		165,008		71,422		41,777		17,565		50,696		137,066		653,232	

TABLE 8

FREQUENCY DISTRIBUTION OF TWELFTH GRADE STUDENT ENROLLMENTS BY REGIONS

Student Enrollments	New England N = 120		Mideast N = 293		Great Lakes N = 409		Southeast N = 258		Plains N = 168		Rocky Mountains N = 51		Southwest N = 148		Farwest N = 275		Total U.S. N = 1722	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
99 or less	1	0.8	15	5.1	39	9.5	58	22.5	66	39.3	12	23.5	35	23.6	2	0.7	228	13.2
100-199	23	19.2	64	21.8	71	17.4	68	26.4	34	20.2	4	7.8	28	18.9	29	10.5	321	18.6
200-299	36	30.0	55	18.8	90	22.0	53	20.5	23	13.7	9	17.6	18	12.2	36	13.1	320	18.6
300-399	21	17.5	52	17.7	66	16.1	36	14.0	13	7.7	4	7.8	16	10.8	49	17.8	257	14.9
400-499	18	15.0	32	10.9	48	11.7	15	5.8	8	4.8	9	17.6	18	12.2	71	25.8	219	12.7
500-599	8	6.7	21	7.2	43	10.5	13	5.0	9	5.3	6	11.8	6	4.1	35	12.7	141	8.2
600-699	7	5.8	23	7.8	24	5.9	7	2.7	5	3.0	4	7.8	16	10.8	22	8.0	108	6.3
700-799	4	3.3	11	3.8	15	3.7	5	1.9	5	3.0	2	3.9	10	6.7	10	3.6	62	3.6
800-899	1	0.8	7	2.4	9	2.2	2	0.8					1	0.7	9	3.3	29	1.7
900-999			2	0.7	3	0.7			1	0.6	1	2.0			3	1.1	10	0.6
1000-up	1	0.8	11	3.8	1	0.2	1	0.4	4	2.4					9	3.3	27	1.6
Totals	120	99.9	293	100.0	409	99.9	258	100.0	168	100.0	51	99.8	148	100.0	275	99.9	1722	100.0
Total Students	42,241		112,320		140,200		61,460		40,655		16,173		46,009		121,503		580,516	

Schools were divided by total enrollment into four basic groups. Schools with student populations of 499 or less accounted for 15 per cent of the sample analyzed. Schools with from 500 to 999 students represented 26.9 per cent. Schools with 1,000 to 1,999 students accounted for 42.3 per cent of the sample. Schools with 2,000 or more students made 15.7 per cent of the sample (Table 9, p. 14).

Schools analyzed in the study represented 3,125,591 public secondary school students. Based on the original population used for sampling, the sample represented 17.8 per cent of all public secondary school students in the United States.

TABLE 9

FREQUENCY DISTRIBUTION OF SCHOOL SIZE BASED ON

TOTAL STUDENT ENROLLMENT BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 139		N = 475		N = 531		N = 429		N = 256		N = 102		N = 199		N = 358		N = 2489	
Total Enrollment	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
499 or less	4	2.9	37	7.8	75	14.1	82	19.1	90	35.2	26	25.5	40	20.1	20	5.6	374	15.0
500-999	37	26.6	139	29.2	130	24.5	145	33.8	72	28.1	36	35.3	59	29.6	51	14.2	669	26.9
1000-1999	78	56.1	223	46.9	224	42.2	173	40.3	76	29.7	34	33.3	62	31.2	184	51.4	1054	42.3
2000-up	20	14.4	76	16.0	102	19.2	29	6.7	18	7.0	6	5.9	38	19.1	103	28.8	392	15.7
Totals	139	100.0	475	99.9	531	100.0	429	99.9	256	100.0	102	100.0	199	100.0	358	100.0	2489	99.9
Total Students	193,591		647,049		706,742		443,996		230,713		98,018		240,716		564,766		3,125,591	

Daily Schedules

School schedules (Table 10, p. 14) indicated about 92 per cent of the schools had the traditional period organization for the school day. Only 5.1 per cent of the schools reported being on a modular type of schedule. Other types of scheduling were reported by 2.7 per cent of the schools. No outstanding variations in schedules were identified.

TABLE 10

FREQUENCY DISTRIBUTION OF TYPES OF SCHOOL SCHEDULES BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 139		N = 471		N = 527		N = 425		N = 256		N = 102		N = 199		N = 350		N = 2466	
Type of Schedule	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Periods	123	88.5	437	92.8	488	92.6	405	95.3	224	88.2	94	92.2	186	93.9	317	90.6	2274	92.2
Modules	10	7.2	21	4.4	29	5.5	13	3.0	21	8.3	6	5.9	5	2.5	20	5.7	125	5.1
Other	6	4.3	13	2.7	10	1.9	7	1.6	9	3.5	2	1.9	7	3.5	13	3.7	67	2.7
Totals	139	100.0	471	99.9	527	100.0	425	99.9	256	100.0	102	100.0	199	99.9	350	100.0	2466	100.0

Periods Per Day

Table 11, p. 15, presents data regarding the number of periods per day in school schedules. The six period day, 41.0 per cent, was most common, followed closely by seven periods, 35.1 per cent of the cases. Eight period days were reported by 13.9 per cent of the schools. The remaining 10 per cent included fewer than six periods and more than eight periods. The extremes were three and ten periods per day. In the Great Lakes Region there were more schools with nine and ten periods, while in the Southeast nine schools, 2.2 per cent, reported ten periods per day.

TABLE 11

FREQUENCY DISTRIBUTION OF THE NUMBER OF PERIODS PER DAY BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 125		N = 434		N = 484		N = 402		N = 224		N = 95		N = 192		N = 327		N = 2283	
Periods Per Day	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
4 or less							1	0.2	1	0.4			1	0.5	14	4.3	17	0.7
5	3	2.4	6	1.4	13	2.7	17	4.2	4	1.8	2	2.1	14	7.3	21	6.4	80	3.5
6	47	37.6	34	7.8	158	32.6	279	69.4	74	33.0	31	32.6	132	68.7	181	55.4	936	41.0
7	60	48.0	189	43.5	177	36.6	86	21.4	126	56.3	49	51.6	37	19.3	77	23.5	801	35.1
8	11	8.8	173	39.8	64	13.2	8	2.0	13	5.8	10	10.5	7	3.6	32	9.8	318	13.9
9	1	0.8	24	5.5	52	10.7	2	0.5	6	2.7	2	2.1			2	0.6	89	3.9
10	3	2.4	8	1.8	20	4.1	9	2.2			1	1.0	1	0.5			42	1.8
Totals	125	100.0	434	99.8	484	99.9	402	99.9	224	100.0	95	99.9	192	100.0	327	100.0	2283	99.9

Length of Periods

Table 12, p. 15, indicates the length of periods. A range of from 40 minutes to over 70 minutes was reported. Periods ranging from 55 to 59 minutes made up 39.8 per cent of the cases. Closely following were periods from 50 to 54 minutes and from 45 to 49 minutes.

Shorter periods, 40 to 44 minutes, were more frequently reported in the New England, Mideast and Great Lakes Regions. Longer periods appeared more often in the Southeast and Southwest regions.

TABLE 12

FREQUENCY DISTRIBUTION OF LENGTH OF PERIODS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 125		N = 443		N = 493		N = 417		N = 231		N = 96		N = 195		N = 330		N = 2330	
Minutes Per Period	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
40-44	38	30.4	192	43.3	76	15.4	1	0.2	4	1.7	2	2.1			12	3.6	325	13.9
45-49	39	31.2	171	38.6	48	9.7	32	7.7	11	4.8	23	23.9	2	1.0	37	11.2	363	15.6
50-54	39	31.2	67	15.1	83	16.9	111	26.6	63	27.3	31	32.3	11	5.6	166	50.3	581	24.9
55-59	8	6.4	12	2.7	257	52.1	238	57.1	140	60.6	37	38.5	146	74.9	90	27.3	928	39.8
60-64	1	0.8			16	3.2	19	4.6	11	4.8	3	3.1	25	12.8	7	2.1	96	4.1
65-69			1	0.2	2	0.4			1	0.4			1	0.5	5	1.5	10	0.4
70-up					3	0.6			1	0.4			10	5.1	13	3.9	27	1.2
Totals	125	100.0	443	99.9	493	99.9	417	100.0	231	100.0	96	99.9	195	99.9	330	99.9	2330	99.9

Length of School Year

The school year (Table 13, p. 16) ranged from less than 174 days to over 200 days. Schools having 180 to 184 days were most common, 69.1 per cent of the cases. Schools with from 175 to 179 days per school year made up 20.8 per cent of the schools sampled. Fewer than one per cent of the schools had less than 174 days a year, while slightly over 9 per cent of the sample schools had over 185 days of school.

TABLE 13

FREQUENCY DISTRIBUTION OF DAYS OF CLASSES PER SCHOOL YEAR BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 139		N = 472		N = 522		N = 428		N = 252		N = 101		N = 199		N = 350		N = 2463	
Days Per School Year	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
174 or less			1	0.2	2	0.4	4	0.9	10	4.0			1	0.5	4	1.2	22	0.9
175-179	8	5.8	1	0.2	96	18.4	92	21.5	79	31.3	2	2.0	37	18.6	198	56.6	513	20.8
180-184	120	86.3	392	83.0	367	70.3	302	70.6	149	59.1	91	90.1	152	76.4	130	37.1	1703	69.1
185-189	11	7.9	70	14.8	34	6.5	18	4.2	10	4.0	7	6.9	2	1.0	12	3.4	164	6.7
190-194			8	1.7	17	3.3	2	0.5	2	0.8	1	1.0	7	3.5	2	0.6	39	1.6
195-199					2	0.4	1	0.2	1	0.4							4	0.2
200-up					4	0.7	9	2.1	1	0.4					4	1.1	18	0.7
Totals	139	100.0	472	99.9	522	100.0	428	100.0	252	100.0	101	100.0	199	100.0	350	100.0	2463	100.0

Percentage of Time Assigned to Teaching Science

Science teaching assignments are shown on Table 14, p. 17. The percentage of science teaching was reported in five equal intervals. Most science teachers were on 80 to 100 per cent assignments teaching science. About one-third of the schools had some teachers teaching science less than half time. No outstanding differences are evident in teacher assignments among the eight regions.

Financial Support for Science Instruction

Table 15, p. 18, presents data regarding regular annual budgets for science equipment. The percentages are quite consistent with a mean of 63.9 per cent among the eight regions. However, New England with 86.7 per cent and the Mideast with 76.2 per cent were considerably higher than the national average. Table 16, p. 18, presents data regarding annual budgets for science supplies. Of the schools analyzed, 75.7 per cent reported a budget. New England had the highest response of 88.8 per cent. Three other regions reported over 80 per cent of their schools had regular annual budgets for science supplies.

The problem of buying equipment and supplies during the school year has often been a problem for science teachers. Principals reported that

TABLE 14

FREQUENCY DISTRIBUTION OF TEACHERS WITH VARYING ASSIGNMENTS

DEVOTED TO SCIENCE TEACHING BY REGIONS

Percent of Assignment in Science & Number of Teachers	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
81-100%																		
0	7	5.1	27	5.8	27	5.2	40	9.7	30	11.8	7	6.9	23	11.9	15	4.3	176	7.2
1-4	12	8.8	93	19.8	206	39.5	178	43.2	139	54.7	57	55.9	77	39.9	158	45.4	920	37.8
5-9	68	50.0	215	45.8	213	40.8	159	38.6	71	28.0	34	33.3	64	33.2	157	45.1	981	40.3
10-14	38	27.9	97	20.7	55	10.5	32	7.8	12	4.7	3	2.9	25	13.0	16	4.6	278	11.4
15-19	7	5.1	26	5.5	19	3.6	2	0.5	2	0.8			2	1.0	2	0.6	60	2.5
20-up	4	2.9	11	2.3	2	0.4	1	0.2			1	1.0	2	1.0			21	0.8
Totals	136	99.8	469	99.9	522	100.0	412	100.0	254	100.0	102	100.0	193	100.0	348	100.0	2436	100.0
61-80%																		
0	124	91.2	416	88.7	420	80.4	356	86.4	219	86.2	82	80.4	159	82.4	260	74.7	2036	83.5
1-4	12	8.8	48	10.2	98	18.8	52	12.6	34	13.4	19	18.6	33	17.0	86	24.7	382	15.7
5-9			2	0.4	3	0.6	4	1.0									9	0.4
10-up			3	0.6	1	0.2			1	0.4	1	1.0	1	0.5	2	0.6	9	0.4
Totals	136	100.0	469	99.9	522	100.0	412	100.0	254	100.0	102	100.0	193	99.9	348	100.0	2436	100.0
41-60%																		
0	106	77.9	368	78.6	387	74.1	306	74.3	192	75.6	72	70.6	143	74.1	240	69.0	1814	74.5
1-4	28	20.6	98	21.0	132	25.3	103	25.0	62	24.4	29	28.4	48	24.9	102	29.2	602	24.7
5-9	1	0.7	2	0.4	2	0.4	3	0.7					1	0.5	3	0.9	12	0.5
10-up	1	0.7			1	0.2					1	1.0	1	0.5	3	0.9	7	0.3
Totals	136	99.9	468	100.0	522	100.0	412	100.0	254	100.0	102	100.0	193	100.0	348	100.0	2435	100.0
21-40%																		
0	111	81.6	399	85.1	409	78.3	325	78.9	218	85.8	88	86.3	159	82.4	260	74.7	1969	80.8
1-4	25	18.4	66	14.1	113	21.6	85	20.6	36	14.2	13	12.7	33	17.0	86	24.7	457	18.8
5-9			4	0.8			2	0.5									6	0.2
10-up											1	1.0	1	0.5	2	0.6	4	0.2
Totals	136	100.0	469	100.0	522	100.0	412	100.0	254	100.0	102	100.0	193	99.9	348	100.0	2436	100.0
0-20%																		
0	115	84.6	399	85.1	409	78.3	309	75.0	209	82.3	79	77.4	150	77.7	275	78.8	1945	79.8
1-4	21	15.4	63	13.4	110	21.1	93	22.6	43	16.9	22	21.6	39	20.2	72	20.6	463	19.0
5-9			5	1.1	3	0.6	9	2.2					1	0.5			18	0.7
10-up			2	0.4			1	0.2	2	0.8	1	1.0	3	1.6	2	0.6	11	0.5
Totals	136	100.0	469	100.0	522	100.0	412	100.0	254	100.0	102	100.0	193	100.0	349	100.0	2437	100.0

88.8 per cent of the schools had funds available for this purpose. Data in Table 17, p. 19, show that availability of funds was quite consistent among the regions.

The use of National Defense Education Act funds since 1968 is shown in Table 18, p. 19. Of the schools analyzed 68.9 per cent reported they had used such funds. Most regions were fairly consistent in the use of these funds. However, only 42.7 per cent of the schools in the Farwest reported use.

Data on Table 19, p. 19, indicate that less use has been made of the Elementary and Secondary Act Funds. Only 43.4 per cent of the schools reported using these funds since 1968. Again the Farwest Region was low with 21.0 per cent of the schools using E.S.E.A. funds.

TABLE 15

FREQUENCY OF SCHOOLS HAVING ANNUAL BUDGETS

FOR NEW SCIENCE EQUIPMENT BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 135		N = 467		N = 521		N = 426		N = 248		N = 98		N = 194		N = 344		N = 2473	
Have Budget	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	18	13.3	111	23.8	213	40.9	187	43.9	112	45.2	33	33.7	74	38.1	130	37.8	878	36.1
Yes	117	86.7	356	76.2	308	59.1	239	56.1	136	54.8	65	66.3	120	61.9	214	62.2	1555	63.9
Totals	135	100.0	467	100.0	521	100.0	426	100.0	248	100.0	98	100.0	194	100.0	344	100.0	2473	100.0

TABLE 16

FREQUENCY OF SCHOOLS HAVING ANNUAL BUDGETS

FOR SCIENCE SUPPLIES BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 134		N = 465		N = 516		N = 411		N = 239		N = 97		N = 192		N = 341		N = 2395	
Have Budget	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	15	11.2	77	16.6	173	33.5	120	29.2	81	33.9	17	17.5	53	27.6	46	13.5	582	24.3
Yes	119	88.8	388	83.4	343	66.5	291	70.8	158	66.1	80	82.5	139	72.4	295	86.5	1813	75.7
Totals	134	100.0	465	100.0	516	100.0	411	100.0	239	100.0	97	100.0	192	100.0	341	100.0	2395	100.0

TABLE 17

FREQUENCY OF SCHOOLS ALLOWING PURCHASE OF EQUIPMENT

AND SUPPLIES DURING SCHOOL YEAR BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 138		N = 472		N = 526		N = 417		N = 246		N = 100		N = 192		N = 349		N = 2440	
Have Funds Available	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	30	21.7	95	20.1	49	9.3	39	9.4	23	9.3	3	3.0	24	12.5	11	3.2	274	11.2
Yes	108	78.3	377	79.9	477	90.7	378	90.6	223	90.7	97	97.0	168	87.5	338	96.8	2166	88.8
Totals	138	100.0	472	100.0	526	100.0	417	100.0	246	100.0	100	100.0	192	100.0	349	100.0	2440	100.0

TABLE 18

FREQUENCY OF SCHOOLS USING NATIONAL DEFENSE EDUCATION ACT FUNDS

SINCE 1968 FOR PURCHASE OF SCIENCE EQUIPMENT BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 137		N = 463		N = 513		N = 406		N = 243		N = 99		N = 189		N = 344		N = 2394	
Used NDEA Funds	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	50	36.5	156	33.7	117	22.8	87	21.4	60	24.7	21	21.2	56	29.6	197	57.3	744	31.1
Yes	87	63.5	307	66.3	396	77.2	319	78.6	183	75.3	78	78.8	133	70.4	147	42.7	1650	68.9
Totals	137	100.0	463	100.0	513	100.0	406	100.0	243	100.0	99	100.0	189	100.0	344	100.0	2394	100.0

TABLE 19

FREQUENCY OF SCHOOLS USING ELEMENTARY AND SECONDARY EDUCATION ACT

FUNDS SINCE 1968 FOR PURCHASE OF SCIENCE EQUIPMENT BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 132		N = 454		N = 490		N = 391		N = 237		N = 94		N = 183		N = 334		N = 2315	
Used ESEA Funds	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	81	61.4	249	54.8	281	57.3	183	46.8	119	50.2	41	43.6	93	50.8	264	79.6	1311	56.6
Yes	51	38.6	205	45.2	209	47.7	208	53.2	118	49.8	53	56.4	90	49.2	70	21.0	1004	43.4
Totals	132	100.0	454	100.0	490	100.0	391	100.0	237	100.0	94	100.0	183	100.0	334	100.0	2315	100.0

In the last decade many schools have used National Defense Education Act Funds for remodeling their science facilities. Table 20, p. 20, indicates that only 14.6 per cent of the schools reported using such funds since 1968. The Farwest was again the lowest with 9.0 per cent of the schools reporting use of these funds. The Rocky Mountain Region was high with 27.5 per cent.

TABLE 20

FREQUENCY OF SCHOOLS REMODELING SCIENCE FACILITIES SINCE 1968

FROM NATIONAL DEFENSE EDUCATION ACT FUNDS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 138		N = 460		N = 521		N = 409		N = 247		N = 99		N = 186		N = 344		N = 2404	
Used NDEA Funds	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	120	87.0	379	82.4	439	84.3	355	86.8	215	87.0	74	72.5	159	85.5	313	91.0	2054	85.4
Yes	18	13.0	81	17.6	82	15.7	54	13.2	32	13.0	25	27.5	27	14.5	31	9.0	350	14.6
Totals	138	100.0	460	100.0	521	100.0	409	100.0	247	100.0	99	100.0	186	100.0	344	100.0	2404	100.0

Homogeneous Grouping in Science Classes

Homogeneous grouping of students in at least some classes in science was reported by 53.1 per cent of the schools. New England with 80.4 per cent and the Mideast with 70.9 per cent were far above the national average in homogeneous grouping. The lowest region was the Plains with 30.5 per cent.

A break-down of the use of homogeneous grouping in science by grade level is shown in Table 21, p. 21. At the national level the percentages increase from seventh through tenth grades. In the seventh grade 39.1 per cent of science classes were grouped; in the eighth grade 42.1 per cent; in the ninth grade 44.8 per cent; and in the tenth grade 56.1 per cent. Since science courses are usually elective at the eleventh and twelfth grades, students tend to select themselves into groups. In the eleventh grade 31.0 per cent, and in the twelfth grade 29.4 per cent were homogeneously grouped by administrative procedures. New England was not only higher in all homogeneous grouping, but followed a different pattern with the ninth grade grouping being lower than in any of the other five grades.

Criteria Used for Homogeneous Grouping

Principals were asked to rank the three criteria they used most frequently in selecting students for homogeneous grouping in science classes. A list of seven possible criteria were given with space for others they might use. One other was listed so frequently that it is reported with the original seven. (See Appendix A, Principals Questionnaire.)

TABLE 21

FREQUENCY OF SCHOOLS HAVING HOMOGENEOUS GROUPING

OF SCIENCE CLASSES BY GRADES AND BY REGIONS

Grade Level	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7th	N = 16		N = 209		N = 132		N = 194		N = 130		N = 55		N = 59		N = 61		N = 856	
	13	81.3	77	63.2	40	30.3	86	44.3	28	21.5	17	30.9	16	27.1	23	37.7	335	39.1
8th	N = 18		N = 214		N = 136		N = 233		N = 131		N = 56		N = 62		N = 64		N = 914	
	14	77.8	139	64.9	45	33.1	98	42.1	27	20.6	15	26.8	21	33.9	26	40.6	385	42.1
9th	N = 93		N = 325		N = 383		N = 311		N = 177		N = 61		N = 138		N = 217		N = 1705	
	63	67.7	220	67.7	187	48.8	118	37.9	42	23.7	16	26.2	48	34.7	70	32.3	764	44.8
10th	N = 123		N = 304		N = 430		N = 261		N = 168		N = 51		N = 146		N = 281		N = 1764	
	89	72.4	187	61.5	178	41.4	112	42.9	34	20.2	18	35.3	45	30.8	111	39.5	990	56.1
11th	N = 121		N = 307		N = 409		N = 259		N = 189		N = 54		N = 146		N = 279		N = 1764	
	86	71.1	150	48.9	116	28.4	69	26.6	26	13.8	12	22.2	31	21.3	57	20.4	547	31.0
12th	N = 120		N = 293		N = 447		N = 258		N = 168		N = 51		N = 148		N = 275		N = 1760	
	85	70.8	141	48.1	105	23.5	64	24.8	19	11.3	12	23.5	34	23.0	58	21.1	518	29.4

Note: Only the number and percent of schools having homogeneous grouping in science classes are reported here. N = the number of schools responding at each grade level.

Teacher Recommendations as a Criterion

Teacher recommendations as the criterion for homogeneous grouping of students in science classes was ranked first and second most important by 37.2 per cent and 25.2 per cent of the principals (Table 22, p. 22). Percentages are fairly consistent among all eight regions. However, this criterion was not used in 28.1 per cent of the schools having homogeneous grouping in the Mideast Region.

TABLE 22

FREQUENCY DISTRIBUTION BY RANK OF TEACHER RECOMMENDATIONS AS A CRITERION FOR HOMOGENEOUS GROUPING IN SCIENCE CLASSES BY REGIONS

Rank of Importance	New England N = 111		Mideast N = 334		Great Lakes N = 277		Southeast N = 211		Plains N = 76		Rocky Mountains N = 39		Southwest N = 92		Farwest N = 159		Total U.S. N = 1299	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	40	36.0	108	32.3	98	35.4	100	47.4	40	52.6	15	38.5	33	35.9	49	30.8	483	37.2
Next	34	30.6	69	20.7	87	31.4	46	21.8	13	17.1	10	25.6	22	23.9	47	29.6	328	25.2
Least	16	14.4	63	18.9	56	20.2	39	18.5	14	18.4	7	17.9	22	23.9	36	22.6	253	19.5
None	21	18.9	94	28.1	36	13.0	26	12.3	9	11.8	7	17.9	15	16.3	27	17.0	235	18.1
Totals	111	99.9	334	100.0	277	100.0	211	100.0	76	99.9	39	99.9	92	100.0	159	100.0	1299	100.0

Marks or Grades as a Criterion

Principals reported a lower application of marks or grades as a criterion for grouping in science classes with 27.6 per cent ranking it most important and 32.7 per cent ranking it second in importance (Table 23, p. 22). Approximately 23 per cent gave no ranking to this criterion.

TABLE 23

FREQUENCY DISTRIBUTION BY RANK OF MARKS OR GRADES AS A CRITERION FOR HOMOGENEOUS GROUPING IN SCIENCE CLASSES BY REGIONS

Rank of Importance	New England N = 111		Mideast N = 334		Great Lakes N = 277		Southeast N = 211		Plains N = 76		Rocky Mountains N = 39		Southwest N = 92		Farwest N = 159		Total U.S. N = 1299	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	40	36.0	109	32.6	68	24.5	54	25.6	22	28.9	8	20.5	24	26.1	34	21.4	359	27.6
Next	31	27.9	109	32.6	96	34.7	65	30.8	20	26.3	10	25.6	33	35.9	61	38.4	425	32.7
Least	15	13.5	50	15.0	46	16.6	41	19.4	17	22.4	14	35.9	16	17.4	21	13.3	220	16.9
None	25	22.5	66	19.8	67	24.2	51	24.2	17	22.4	7	17.9	19	20.6	43	27.0	295	22.7
Totals	111	99.9	334	100.0	277	100.0	211	100.0	76	100.0	39	99.9	92	100.0	159	100.0	1299	99.9

Aptitude Tests as a Criterion

The use of scores on aptitude tests were ranked very much lower than the first two criteria discussed (Table 24, p. 23). Only 9.5 per cent of the principals reported it most used and 12.2 per cent next most used. The criterion was not ranked as important by 67.1 per cent of the principals. No extreme percentage differences were found among the eight regions.

TABLE 24

FREQUENCY DISTRIBUTION BY RANK OF APTITUDE TEST(S) AS A CRITERION

FOR HOMOGENEOUS GROUPING IN SCIENCE CLASSES BY REGIONS

Rank of Importance	New England N = 111		Mideast N = 334		Great Lakes N = 277		Southeast N = 211		Plains N = 76		Rocky Mountains N = 39		Southwest N = 92		Farwest N = 159		Total U.S. N = 1299	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	4	3.6	17	5.1	37	13.3	23	10.9	8	10.5	3	7.7	10	13.0	22	13.8	124	9.5
Next	6	5.4	32	9.6	46	16.6	32	15.2	7	9.2	2	5.1	16	17.4	17	10.7	158	12.2
Least	10	9.0	36	10.8	34	12.3	29	13.7	9	11.8	2	5.1	12	10.9	14	8.8	146	11.2
None	91	73.0	248	74.5	160	57.8	127	60.2	52	68.4	32	82.1	54	58.7	106	66.7	871	67.1
Totals	111	100.0	334	100.0	277	100.0	211	100.0	76	99.9	39	100.0	92	100.0	159	100.0	1299	100.0

Student Interest as a Criterion

Principals ranked student interest in science as a criterion for grouping slightly lower than aptitude tests (Table 25, p. 23). Only 9.0 per cent ranked it most used, and 9.3 per cent next most used. It was not used as a criterion by 73.2 per cent of the principals. There were only a few variations in application of this criterion among the different regions.

TABLE 25

FREQUENCY DISTRIBUTION BY RANK OF STUDENT INTEREST AS A CRITERION

FOR HOMOGENEOUS GROUPING IN SCIENCE CLASSES BY REGIONS

Rank of Importance	New England N = 111		Mideast N = 334		Great Lakes N = 277		Southeast N = 211		Plains N = 76		Rocky Mountains N = 39		Southwest N = 92		Farwest N = 159		Total U.S. N = 1299	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	6	5.4	24	7.2	30	10.8	20	9.5	1	1.3	5	12.8	7	7.6	24	15.1	117	9.0
Next	7	6.3	15	4.5	33	11.9	18	8.5	13	17.1	5	12.8	7	7.6	23	14.5	121	9.3
Least	17	15.3	29	8.7	23	8.3	17	8.1	5	6.6	2	5.1	7	7.6	10	6.3	110	8.5
None	81	73.0	266	79.6	191	69.0	156	73.9	57	75.0	27	69.2	71	77.2	102	64.1	951	73.2
Totals	111	100.0	334	100.0	277	100.0	211	100.0	76	100.0	39	99.9	92	100.0	159	100.0	1299	100.0

Intelligence Tests as a Criterion

Little importance was given to scores on intelligence tests as a criterion for homogeneous grouping in science classes as shown in Table 26, p. 24. Little variation among the regions was evident. In the Southwest region however, it was ranked most important by 14.1 per cent of the principals as compared to 7.6 per cent nationally. The Plains and Great Lakes Regions ranked intelligence test scores next most important with 17.1 per cent and 15.9 per cent respectively. The national average was 11.9 per cent. Over 60 per cent reported they did not use intelligence tests in determining groups.

TABLE 26

FREQUENCY DISTRIBUTION BY RANK OF INTELLIGENCE TEST(S) AS A CRITERION FOR HOMOGENEOUS GROUPING IN SCIENCE CLASSES BY REGIONS

Rank of Importance	New England N = 111		Mideast N = 334		Great Lakes N = 277		Southeast N = 211		Plains N = 100		Rocky Mountains N = 39		Southwest N = 92		Farwest N = 159		Total U.S. N = 1299	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	3	2.7	25	7.5	19	6.9	13	6.1	5	6.6	3	7.7	13	14.1	18	11.3	99	7.6
Next	11	9.9	37	11.1	44	15.9	23	10.9	13	17.1	2	5.1	6	6.5	19	11.9	155	11.9
Least	6	5.4	52	15.6	40	14.4	40	19.0	19	25.0	3	7.7	18	19.6	31	19.5	209	16.1
None	91	82.0	220	65.8	174	62.8	135	64.0	39	51.3	31	79.5	55	59.8	91	57.3	836	64.4
Totals	111	100.0	334	100.0	277	100.0	211	100.0	100	100.0	39	100.0	92	100.0	159	100.0	1299	100.0

Counsellor's Recommendations as a Criterion

Recommendations of Counsellors for grouping in science classes was low. This was consistent among the regions with a few minor exceptions (Table 27, p. 24). Over 60 per cent of the principals reported that counsellor recommendations were not used.

TABLE 27

FREQUENCY DISTRIBUTION BY RANK OF COUNSELLOR'S RECOMMENDATIONS AS A CRITERION FOR HOMOGENEOUS GROUPING IN SCIENCE CLASSES BY REGIONS

Rank of Importance	New England N = 111		Mideast N = 334		Great Lakes N = 277		Southeast N = 211		Plains N = 76		Rocky Mountains N = 39		Southwest N = 92		Farwest N = 159		Total U.S. N = 1299	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	9	8.1	14	4.2	23	8.3	5	2.4	2	2.6	3	7.7	2	2.2	18	11.3	76	5.8
Next	8	7.2	37	11.1	42	15.1	19	9.0	10	13.2	7	17.9	4	4.3	31	19.5	158	12.2
Least	29	26.1	66	19.8	55	19.9	33	15.6	13	17.1	8	20.5	14	15.2	39	24.5	257	19.8
None	65	58.6	217	64.9	157	56.7	154	73.0	51	67.1	21	53.8	72	78.3	71	44.7	808	62.2
Totals	111	100.0	334	100.0	277	100.0	211	100.0	76	100.0	39	99.9	92	100.0	159	100.0	1299	100.0

Reading Tests as a Criterion

Scores on reading tests as a criterion for grouping was added to the original list. Eighty-five principals added this criterion and gave it one of the first three ranks of importance (Table 28, p. 25). Comparisons are difficult, however, since it was not one of the stated procedures on the instrument.

TABLE 28

FREQUENCY DISTRIBUTION BY RANK OF READING TEST(S) AS A CRITERION FOR HOMOGENEOUS GROUPING IN SCIENCE CLASSES BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 111		N = 334		N = 277		N = 211		N = 76		N = 39		N = 92		N = 159		N = 1299	
Rank of Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	3	2.7	25	7.5	5	1.8	2	0.9	1	1.3	1	2.6	4	4.3	7	4.4	48	3.7
Next	2	1.8	3	0.9	1	0.3	6	2.8	1	1.3	1	2.6	1	1.1	4	2.5	19	1.5
Least	2	1.8	7	2.1	3	1.1	2	0.9					2	2.2	2	1.3	18	1.4
None	104	93.7	299	89.5	268	96.8	201	95.3	74	97.4	37	94.8	85	92.4	146	91.8	1214	93.4
Totals	111	100.0	334	100.0	277	100.0	211	99.9	76	100.0	39	100.0	92	100.0	159	100.0	1299	100.0

Parent Recommendations as a Criterion

Recommendations of parents for grouping in science classes was rejected as a valid criterion by 92.1 per cent of the principals (Table 29, p. 25). This rejection was quite consistent across all eight regions.

TABLE 29

FREQUENCY DISTRIBUTION BY RANK OF PARENT RECOMMENDATIONS AS A CRITERION FOR HOMOGENEOUS GROUPING IN SCIENCE CLASSES BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 111		N = 334		N = 277		N = 211		N = 76		N = 39		N = 92		N = 159		N = 1299	
Rank of Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most			2	0.6	2	0.7	2	0.9							3	1.9	9	0.7
Next	3	2.7	10	3.0	6	2.2	5	2.4	1	1.3			1	1.1	12	7.5	38	2.9
Least	7	6.3	6	1.8	17	6.1	12	5.7	1	1.3			1	1.1	12	7.5	56	4.3
None	101	91.0	316	94.6	252	91.0	192	91.0	74	97.4	39	100.0	90	97.8	132	83.0	1196	92.1
Totals	111	100.0	334	100.0	277	100.0	211	100.0	76	100.0	39	100.0	92	100.0	159	99.9	1299	100.0

Summary of Criteria for Homogeneous Grouping in Science Classes

Two criteria were used most consistently for homogeneous grouping of students in science classes where such grouping occured. First was the recommendation of teachers who have had the students in other classes. Not far behind was the application of grades or marks as a criterion for grouping. All other criteria were used much less.

Teachers in Sample Schools

Principals were asked to state the number of science teachers in their schools by sex and by status as full-time or part-time teachers. Five tables were generated from the data which will be discussed individually in this section.

Number of Science Teachers Per School

The principals in 2,461 of the schools sampled completed this section of the questionnaire (Table 30, p. 26). Most of the schools (50.3 per cent) had from five to nine science teachers. The second largest category was from one to four teachers (28.4 per cent). Another 16.5 per cent of the schools had from ten to fourteen teachers, 3.8 per cent from fifteen to nineteen. Very few schools had twenty or more science teachers.

Means among the regions ranged from 4.78 science teachers per school in the Plains to 9.99 in the New England Region.

TABLE 30

FREQUENCY DISTRIBUTION OF ALL SCIENCE TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 139		N = 469		N = 526		N = 425		N = 249		N = 101		N = 197		N = 355		N = 2461	
Number of Teachers	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1-4	9	6.5	75	16.0	143	27.2	133	31.3	134	53.8	44	43.6	74	37.6	87	24.5	699	28.4
5-9	58	41.7	223	47.5	274	52.1	230	54.1	95	38.2	49	48.5	84	42.6	225	63.4	1238	50.3
10-14	54	38.8	118	25.1	80	15.2	54	12.7	19	7.6	7	6.9	33	16.8	40	11.3	405	16.5
15-19	14	10.1	38	8.1	25	4.7	6	1.4	1	0.4	1	1.0	5	2.5	3	0.8	93	3.8
20-up	4	2.9	15	3.2	4	0.8	2	0.5					1	0.5			26	1.0
Totals	139	100.0	469	99.9	526	100.0	425	100.0	249	100.0	101	100.0	197	100.0	355	100.0	2461	100.0
$\bar{x}$	9.99		9.23		7.08		6.17		4.78		5.25		6.52		6.39			
SD	5.13		6.24		3.98		3.24		2.82		2.62		3.95		2.65			

Full-Time Science Teachers

Table 31, p. 26, indicates the number of the sample teachers that were classified as full-time teachers. Again the means show a low of 4.58 full-time teachers per school in the Plains to a high of 9.63 full-time science teachers per school in New England.

TABLE 31

FREQUENCY DISTRIBUTION OF FULL-TIME SCIENCE TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 139		N = 469		N = 526		N = 425		N = 249		N = 101		N = 197		N = 355		N = 2461	
Number of Teachers	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0							1	0.2	1	0.4	1	1.0					3	0.1
1-4	11	7.9	87	18.6	164	31.2	147	34.6	140	56.2	46	45.5	78	39.6	107	30.1	780	31.7
5-9	65	46.8	219	46.7	256	48.6	225	52.9	89	35.7	46	45.5	82	41.6	218	61.4	1200	48.7
10-14	50	36.0	117	24.9	78	14.8	47	11.1	18	7.2	7	6.9	32	16.2	27	7.6	376	15.3
15-19	10	7.2	32	6.8	24	4.6	4	0.9	1	0.4	1	1.0	4	2.0	3	0.8	79	3.2
20-up	3	2.1	14	3.0	4	0.8	1	0.2					1	0.5			23	1.0
Totals	139	100.0	469	100.0	526	100.0	425	99.9	249	99.9	101	99.9	197	99.9	355	99.9	2461	100.0
$\bar{x}$	9.63		8.98		6.82		5.82		4.58		5.03		6.35		5.98			
SD	5.13		6.23		4.02		3.11		2.83		2.60		3.94		3.34			

Part-Time Science Teachers

Based on the total number of science teachers in the schools sampled, only 4.0 per cent were classified as part-time teachers. Principals in 81.5 per cent of the 2,461 schools indicated they had no part-time science teacher in their schools (Table 32, p. 27). Percentage variations among the regions was slight.

TABLE 32

FREQUENCY DISTRIBUTION OF PART-TIME SCIENCE TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 139		N = 469		N = 526		N = 425		N = 249		N = 101		N = 197		N = 355		N = 2461	
Number of Teachers	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	107	77.0	387	82.5	429	81.6	341	80.2	214	85.9	84	83.2	170	86.3	275	77.5	2007	81.5
1-4	32	23.0	80	17.1	96	18.2	81	19.1	35	14.1	17	16.8	27	13.7	79	22.2	447	18.2
5-9			2	0.4	1	0.2	3	0.7							1	0.3	7	0.3
Totals	139	100.0	469	100.0	526	100.0	425	100.0	249	100.0	101	100.0	197	100.0	355	100.0	2461	100.0
$\bar{x}$	0.37		0.25		0.27		0.34		0.20		0.23		0.18		0.36			
SD	0.84		0.66		0.67		1.19		0.57		0.56		0.50		0.85			

Sex of Science Teachers

Principals indicated that approximately 75 per cent of the science teachers were males. Only 1.2 per cent of the schools had no male teachers (Table 33, p. 28), while 29 per cent of the schools had no female teachers (Table 34, p. 28).

Means are given for the regions. However variations among the regions are best seen by examining the percentages of males to total science teachers in the regions. In the Southeast 57.4 per cent were males and in the Farwest 82.5 per cent of all science teachers were males. Again two distinct clusters of four regions each may be observed; however the percentage of female teachers in the Southeast Region was clearly higher than the others.

Summary

From the preceding tables a few general conditions were observed. First, most schools have full-time science teachers and very few use part-time science teachers. Second, two regions including the Southeast and the Southwest have considerably more female science teachers than the national average. Finally the regions of the Farwest, Great Lakes, Plains and Rocky Mountains were noticeably below the national average in the percent of female science teachers.

TABLE 33

FREQUENCY DISTRIBUTION OF MALE SCIENCE TEACHERS BY REGIONS

Number of Teachers	New England N = 139		Mideast N = 469		Great Lakes N = 526		Southeast N = 425		Plains N = 249		Rocky Mountains N = 101		Southwest N = 197		Farwest N = 355		Total U.S. N = 2461	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0			2	0.4	2	0.4	18	4.2	4	1.6	1	1.0	2	1.0			29	1.2
1-4	22	15.8	147	31.3	204	38.8	288	67.8	155	62.2	59	58.4	114	57.9	155	43.7	1144	46.5
5-9	91	65.5	232	49.5	263	50.0	111	26.1	84	33.7	39	38.6	71	36.0	183	51.5	1073	43.6
10-14	23	16.5	70	14.9	49	9.3	7	1.6	6	2.4	2	2.0	9	4.6	17	4.8	183	7.4
15-19	1	0.7	10	2.1	6	1.1											17	0.7
20-up	2	1.4	8	1.7	2	0.4	1	0.2					1	0.5			15	0.6
Totals	139	99.9	469	99.9	526	100.0	425	99.9	249	99.9	101	100.0	197	100.0	355	100.0	2461	100.0
$\bar{x}$	7.58		6.86		5.78		3.54		3.89		4.23		4.52		5.23			
SD	4.11		4.47		3.28		2.41		2.35		2.12		3.25		2.32			
Teachers	1,053		3,217		3,039		1,504		969		431		890		1,872		12,975	
Percent of Total	75.8		74.3		81.6		57.4		81.4		80.4		69.3		82.5		74.8	

TABLE 34

FREQUENCY DISTRIBUTION OF FEMALE SCIENCE TEACHERS BY REGIONS

Number of Teachers	New England N = 139		Mideast N = 469		Great Lakes N = 526		Southeast N = 425		Plains N = 249		Rocky Mountains N = 101		Southwest N = 197		Farwest N = 355		Total U.S. N = 2461	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	24	17.3	87	18.5	189	35.9	54	12.7	122	49.0	40	39.6	50	25.4	147	41.4	713	29.0
1-4	89	64.0	323	68.9	315	59.9	293	68.9	124	49.8	60	59.4	124	62.9	201	56.6	1529	62.1
5-9	26	18.7	53	11.3	22	4.2	76	17.9	3	1.2	1	1.0	21	10.7	6	1.7	208	8.5
10-up			6	1.3			2	0.5					2	1.0	1	0.3	11	0.4
Totals	139	100.0	469	100.0	526	100.0	425	100.0	249	100.0	101	100.0	197	100.0	355	100.0	2461	100.0
$\bar{x}$	2.42		2.37		1.31		2.63		0.89		1.03		2.01		1.11			
SD	2.07		2.76		1.54		1.97		1.25		1.14		2.13		1.41			
Teachers	336		1,111		687		1,118		221		105		395		397		4,370	
Percent of Total	24.2		25.7		18.4		42.6		18.6		19.6		30.7		17.3		25.2	

Secondary school science courses have received great attention in the United States during the past fifteen years. School foundations, government agencies, and professional organizations have spent time and large sums of money for the revision and improvement of content and instruction in science. One of the major purposes of this study was to determine what science was being taught in our secondary schools during the 1970-71 school year. Science course information will be presented under two main headings. First, data on those courses with the usual course titles, which have been in the curriculum for many years, will be presented. Second will be the data related to science course improvement projects which came into existence with the inception of the Physical Science Study Committee's course in physics.

Each subject area will be presented in multiple table form. Since many science courses are taught at two or more grade levels, different tables are given for courses in several types of secondary schools. The first table in each course will give a frequency distribution of student enrollments in all the sample schools. Total student enrollments are presented for each region.

General Science

Of the 2,428 schools in the sample, 1,025 schools offered a course in General Science. Estimated total enrollment in the sample schools was 332,647 students (Table 35, p. 29).

TABLE 35

FREQUENCY DISTRIBUTION OF STUDENTS IN GENERAL SCIENCE BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	95	68.3	231	48.6	251	51.0	218	50.8	173	67.6	71	69.6	164	82.4	200	59.5	1403	57.8
99 or less	14	10.1	34	7.2	71	14.4	41	9.5	40	15.6	17	16.6	15	7.5	40	11.9	272	11.2
100-199	14	10.1	38	8.0	49	10.0	62	14.5	17	6.6	1	1.0	5	2.5	31	9.2	217	8.9
200-299	5	3.6	44	9.3	46	9.3	34	7.9	6	2.3	3	2.9	1	0.5	13	3.8	152	6.3
300-399	4	2.9	27	5.7	24	4.9	16	3.7	9	3.5	1	1.0	2	1.0	22	6.5	105	4.3
400-499	3	2.2	17	3.6	24	4.9	18	4.2	2	0.8	2	2.0	4	2.0	6	1.8	76	3.1
500-599	1	0.7	11	2.3	6	1.2	12	2.8	4	1.6	3	2.9	2	1.0	8	2.4	47	1.9
600-699	1	0.7	15	3.2	5	1.0	5	1.2	1	0.4	1	1.0	1	0.5	7	2.1	36	1.5
700-799	1	0.7	5	1.0	5	1.0	6	1.4			2	2.0	2	1.0	3	0.9	24	1.0
800-up	1	0.7	53	11.1	11	2.2	17	4.0	4	1.6	1	1.0	3	1.5	6	1.8	96	4.0
Totals	139	100.0	475	100.0	492	99.9	429	100.0	256	100.0	102	100.0	199	99.9	336	99.9	2428	100.0
	N = 44		N = 244		N = 241		N = 211		N = 83		N = 31		N = 35		N = 136			
Total Students	10,555		114,171		57,363		70,785		18,184		8,663		10,304		42,622		332,647	

It would seem logical that more General Science courses would be offered in schools with grades 7 through 9. In comparing percentages of schools offering the course (Tables 36 and 37), this was found to be true in all regions. However, schools including grades 7--9 frequently offered General Science to students in other grades.

TABLE 36

PERCENTAGE OF SCHOOLS OFFERING GENERAL SCIENCE

BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
	%	%	%	%	%	%	%	%
7-9		53	62	40	25	35	19	60
7-12		64	88	65	50			
9-12	48	64	49	59	44		15	49
10-12	3	13	8	18	10	10	6	12

TABLE 37

FREQUENCY DISTRIBUTION OF GENERAL SCIENCE ENROLLMENTS OF TOTAL POPULATION

IN THREE YEAR (7-9) JUNIOR HIGH SCHOOLS BY REGIONS

Percent of Student Population	Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	54	46.6	24	38.1	57	60.0	48	75.0	26	65.0	30	81.1	20	40.0
1-9%	4	3.4	3	4.8	0	0.0	2	3.1	3	7.5	1	2.7	2	4.0
10-19%	0	0.0	2	3.2	6	6.3	1	1.6	1	2.5	1	2.7	1	2.0
20-29%	4	3.4	5	7.9	2	2.1	2	3.1	0	0.0	0	0.0	1	2.0
30-39%	13	11.2	13	20.6	10	10.5	10	15.6	4	10.0	4	10.8	18	36.0
40-49%	2	1.7	0	0.0	1	1.0	0	0.0	1	2.5	0	0.0	3	6.0
50-59%	0	0.0	3	4.8	3	3.2	0	0.0	1	2.5	0	0.0	2	4.0
60-69%	6	5.2	9	14.3	6	6.3	0	0.0	3	7.5	1	2.7	1	2.0
70-79%	3	2.6	4	6.3	5	5.3	0	0.0	0	0.0	0	0.0	2	4.0
80-89%	6	5.2	0	0.0	2	2.1	0	0.0	1	2.5	0	0.0	0	0.0
90-99%	24	20.7	0	0.0	3	3.2	1	1.6	0	0.0	0	0.0	0	0.0
Totals	116	100.0	63	100.0	95	100.0	64	100.0	40	100.0	37	100.0	50	100.0

Tables 38, 39, and 40, p. 31, present data regarding enrollments in schools including grades 7-12, 9-12, and 10-12. Enrollments in general science were primarily in grades 7, 8, and 9; hence, percentages of enrollments are largest in 7-12 schools and decrease in 10-12 type schools.

TABLE 38

FREQUENCY DISTRIBUTION OF PERCENTAGE OF GENERAL SCIENCE ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	M 'ast		Great Lakes		Southeast		Plains	
	No.	%	No.	%	No.	%	No.	%
0	25	36.2	5	12.2	18	35.3	31	50.0
1-9%	4	5.8	1	2.4	3	5.9	5	8.1
10-19%	13	18.8	9	22.0	7	13.7	15	24.2
20-29%	2	2.9	3	7.3	2	3.9	3	4.8
30-39%	7	10	17	41.5	9	17.7	4	6.5
40-49%	6	8.7	6	14.6	2	3.9	1	1.6
50-59%	11	15.9	0	0.0	7	13.7	3	4.8
60%-Up	1	1.5	0	0.0	3	5.9	0	0.0
Totals	69	99.9	41	100.0	51	100.0	62	100.0

TABLE 39

FREQUENCY DISTRIBUTION OF PERCENTAGE OF GENERAL SCIENCE ENROLLMENTS IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	42	52.5	51	35.9	137	51.3	43	41.3	29	55.8	73	84.9	84	51.2
1-9%	15	8.8	16	11.3	37	13.9	12	11.5	6	11.5	2	2.3	46	28.0
10-19%	13	16.3	27	19.0	50	18.7	17	16.4	7	13.5	2	2.3	22	13.4
20-29%	7	8.7	34	23.9	39	14.6	18	17.3	9	17.3	6	7.0	11	6.7
30-39%	3	3.7	11	7.7	2	0.7	11	10.6	1	1.9	3	3.5	1	0.6
40-Up	0	0.0	3	2.1	2	0.7	3	2.9	0	0.0	0	0.0	0	0.0
Totals	80	100.0	142	99.9	267	99.9	104	100.0	52	100.0	86	100.0	164	99.9

TABLE 40

FREQUENCY DISTRIBUTION OF PERCENTAGE OF GENERAL SCIENCE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 39		Mideast N = 101		Great Lakes N = 126		Southeast N = 72		Plains N = 59		Rocky Mountains N = 31		Southwest N = 47		Farwest N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	38	97.4	88	87.1	116	92.1	59	81.9	53	89.8	28	90.3	44	93.6	109	87.9
1-9%	1	2.6	10	9.9	7	5.5	9	12.5	3	5.1	3	9.7	2	4.3	11	8.9
10-19%			1	1.0	2	1.6	3	4.2	2	3.4					2	1.6
20-29%					1	0.8			1	1.7					1	0.8
30%-up			2	2.0			1	1.4					1	2.1	1	0.8
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Life Science

Of the 2,428 schools in the sample, 621 schools offered courses in Life Science. Estimated total enrollment in the sample schools was 140,563 students (Table 41, p. 32).

TABLE 41

FREQUENCY DISTRIBUTION OF STUDENTS

IN LIFE SCIENCE BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	121	87.1	365	76.8	423	86.0	316	73.7	152	59.4	57	55.9	148	74.4	215	64.0	1797	74.0
99 or less	10	7.2	23	4.8	22	4.5	15	3.5	35	13.7	12	11.7	18	9.0	48	14.3	183	7.5
100-199	6	4.3	27	5.7	18	3.7	28	6.5	21	8.2	7	6.9	7	3.5	31	9.2	145	6.0
200-299	1	0.7	29	6.1	12	2.4	27	6.3	16	6.2	13	12.7	11	5.5	17	5.0	126	5.2
300-399			16	3.4	7	1.4	21	4.9	15	5.8	7	6.9	6	3.0	9	2.7	81	3.3
400-499			7	1.5	7	1.4	13	3.0	12	4.7	6	5.9	5	2.5	9	2.7	59	2.4
500-599			3	0.6	3	0.6	6	1.4	1	0.4			1	0.5	5	1.5	19	0.8
600-up	1	0.7	5	1.1			3	0.6	4	1.6			3	1.5	2	0.6	18	0.7
Totals	139	100.0	475	100.0	492	100.0	429	99.9	256	100.0	102	100.0	199	99.9	336	100.0	2428	99.9
	N = 18		N = 110		N = 69		N = 113		N = 104		N = 45		N = 51		N = 121			
Total Students	2,255		26,937		13,353		29,672		25,277		9,892		11,247		21,980		140,563	

Table 42, p. 32, presents data regarding percentages of types of schools offering Life Science by regions. From this table and from tables 43, 44, 45, and 46, p. 33-34, it is evident that Life Science courses were offered most often in grades 7,8, and 9. Some Life Science courses were offered in schools with other grades, primarily grade 10.

TABLE 42

PERCENTAGE OF SCHOOLS OFFERING LIFE SCIENCE

BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
	%	%	%	%	%	%	%	%
7-9		31	37	53	75	73	68	40
7-12		43	19	51	66			
9-12	6	8	9	10	4		12	40
10-12	8	13	8	6	7	13	2	20

TABLE 43

FREQUENCY DISTRIBUTION OF PERCENTAGE OF LIFE SCIENCE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (7-9) JUNIOR HIGH SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 116		N = 63		N = 95		N = 64		N = 40		N = 37		N = 37	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	80	69.0	40	63.5	45	47.4	16	25.0	11	27.5	12	32.4	30	60.0
1-9%			2	3.2			2	3.1	2	5.0	1	2.7	2	4.0
10-19%	2	1.7	1	1.6	1	1.0	1	1.6			1	2.7	2	4.0
20-29%	2	1.7	3	4.7	6	6.3	5	7.8			1	2.7	1	2.0
30-39%	29	25.0	17	27.0	40	42.1	38	59.3	27	67.5	22	59.5	14	28.0
40%-up	3	2.6			3	3.2	2	3.1					1	2.0
Totals	116	100.0	63	100.0	95	100.0	64	99.9	40	100.0	37	100.0	50	100.0

TABLE 44

FREQUENCY DISTRIBUTION OF PERCENTAGE OF LIFE SCIENCE ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains	
Percent of Student Population	N = 69		N = 41		N = 51		N = 62	
	No.	%	No.	%	No.	%	No.	%
0	39	56.5	33	80.5	25	49.0	21	33.9
1-9%	2	2.9	2	4.9	2	3.9	2	3.2
10-19%	25	36.2	5	12.2	9	17.7	34	54.8
20-29%	3	4.4	1	2.4	13	25.5	4	6.5
30%-up					2	3.9	1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 45

FREQUENCY DISTRIBUTION OF PERCENTAGE OF LIFE SCIENCE ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
Percent of Student Population	N = 80		N = 142		N = 267		N = 104		N = 52		N = 86		N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	75	93.7	130	91.5	244	91.4	94	90.4	50	96.2	76	88.4	98	59.7
1-9%	5	6.3	8	5.6	10	3.7	4	3.8	2	3.8	6	7.0	45	27.4
10-19%			1	0.7	10	3.7	3	2.9			2	2.3	18	11.0
20-29%			1	0.7	3	1.1	2	1.9			1	1.1	3	1.8
30%-up			2	1.4			1	0.9			1	1.1		
Totals	80	100.0	142	99.9	267	99.9	104	99.9	52	100.0	86	99.9	164	99.9

TABLE 46

FREQUENCY DISTRIBUTION OF PERCENTAGE OF LIFE SCIENCE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	36	92.3	88	87.1	116	92.1	68	94.4	55	93.2	27	87.1	46	97.9	99	79.8
1-9%	3	7.7	8	7.9	5	3.9	1	1.4			4	12.9	1	2.1	12	9.7
10-19%			1	1.0	3	2.4	1	1.4	2	3.4					10	8.1
20-29%			1	1.0	1	0.8	1	1.4	1	1.7					2	1.6
30%-up			3	3.0	1	0.8	1	1.4	1	1.7					1	0.8
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Physical Science

Of the sample schools, 1,185 schools offered courses in Physical Science. Approximate total enrollment in the sample schools was 209,768 (Table 47, p. 34).

TABLE 47

FREQUENCY DISTRIBUTION OF STUDENTS IN PHYSICAL SCIENCE BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	60	43.2	285	60.9	243	49.4	223	52.0	121	47.2	46	45.1	88	44.2	180	53.1	1246	51.3
99 or less	55	39.6	100	21.1	123	25.0	90	21.0	61	23.8	24	23.5	29	14.6	85	25.1	567	23.3
100-199	12	8.6	36	7.6	55	11.2	47	11.0	33	12.9	10	9.8	20	10.1	39	11.5	252	10.4
200-299	7	5.0	22	4.6	35	7.1	28	6.5	15	5.9	11	10.8	24	12.1	8	2.3	150	6.2
300-399	1	0.7	20	4.2	19	3.9	21	4.9	13	5.1	8	7.8	10	5.0	12	3.5	104	4.3
400-499	2	1.4	7	1.5	6	1.2	9	2.1	6	2.3	3	2.9	6	3.0	8	2.3	47	1.9
500-599	1	0.7	1	0.2	5	1.0	5	1.1	2	0.8			8	4.0	4	1.2	26	1.0
600-699			2	0.4	3	0.6	4	0.9	1	0.4			9	4.5	1	0.3	20	0.8
700-up	1	0.7	2	0.4	3	0.6	2	0.4	4	1.6			5	2.5	2	0.6	19	0.8
Totals	139	99.9	475	100.0	492	100.0	429	99.9	256	100.0	102	99.9	199	100.0	339	99.9	2431	100.0
	N = 79		N = 190		N = 249		N = 206		N = 135		N = 56		N = 111		N = 159			
Total Students	10,950		29,355		39,139		36,477		24,252		9,177		34,141		26,277		209,768	

Table 48, p. 35, presents data regarding percentages of types of schools offering Physical Science by regions. From this Table and from Tables 49, 50, 51, and 52, p. 35-36, it is obvious that a course called Physical Science is offered at many grade levels. Data from individual questionnaires indicate that a Physical Science course is frequently offered as a basic course in grades 7, 8, or 9. It also is frequently offered as a possible science course in a number of schools in grades 10, 11, or 12; at this level, it usually is offered as a science course for students who do not take chemistry or physics.

TABLE 48

PERCENTAGE OF SCHOOLS OFFERING PHYSICAL SCIENCE

BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-9		25	48	56	75	80	81	34
7-12		42	41	41	60			
9-12	60	47	48	55	44		73	51
10-12	56	50	47	44	36	32	28	42

TABLE 49

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PHYSICAL SCIENCE ENROLLMENTS OF

TOTAL POPULATION IN THREE YEAR (7-9) JUNIOR HIGH SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 116		N = 63		N = 95		N = 64		N = 40		N = 37		N = 50	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	87	75.0	33	52.4	42	44.2	16	25.0	8	20.0	7	18.9	33	66.0
1-9%	4	3.4	11	17.5	7	7.4	5	7.8	4	10.0	2	5.4	3	6.0
10-19%	2	1.7	8	12.7	14	14.7	6	9.3	3	7.5	4	10.8	2	4.0
20-29%	3	2.6	1	1.6	12	12.6	9	14.1	4	10.0	7	18.9	2	4.0
30-39%	17	14.7	7	11.1	18	19.0	27	42.2	21	52.5	16	43.2	8	16.0
40-49%	2	1.7	3	4.7										
50%-up	1	0.9			2	2.1	1	1.6			1	2.7	2	4.0
Totals	116	100.0	65	100.0	95	100.0	64	100.0	40	100.0	37	99.9	50	100.0

TABLE 50

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PHYSICAL SCIENCE ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	40	58.0	24	58.5	30	58.8	25	40.3
1-9%	14	20.3	8	19.5	10	19.6	7	11.3
10-19%	12	17.4	7	17.1	9	17.6	25	40.3
20-29%	3	4.3	2	4.9	1	1.2	3	4.8
30%-up					1	1.2	2	3.2
Totals	69	100.0	41	100.0	51	100.0	62	99.9

TABLE 51

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PHYSICAL SCIENCE ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	32	40.0	75	52.8	138	51.7	47	45.2	29	55.8	23	26.7	81	49.4
1-9%	31	38.7	52	36.6	69	25.8	24	23.0	7	13.5	8	9.3	61	37.2
10-19%	11	13.7	4	2.8	35	13.1	10	9.6	6	11.5	14	16.4	16	9.8
20-29%	5	6.3	5	3.5	23	8.6	15	14.4	10	19.2	21	24.4	5	3.0
30-39%			6	4.2	2	0.7	4	3.9			18	20.9	1	0.6
40%-up	1	1.3					4	3.9			2	2.3		
Totals	80	100.0	142	99.9	267	99.9	104	100.0	52	100.0	86	100.0	164	100.0

TABLE 52

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PHYSICAL SCIENCE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 39		Mideast N = 101		Great Lakes N = 126		Southeast N = 72		Plains N = 59		Rocky Mountains N = 31		Southwest N = 47		Farwest N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	17	43.6	50	49.5	66	52.4	40	55.5	38	64.4	21	67.7	34	72.3	72	58.1
1-9%	21	53.8	34	33.7	46	36.5	28	38.9	18	30.5	8	25.8	13	27.7	41	33.0
10-19%	1	2.6	14	13.8	9	7.1	4	5.6	1	1.7	2	6.5			10	8.1
20-29%					3	2.4			2	3.4						
30%-up			3	3.0	2	1.6									1	0.8
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Health Science

Of the sample schools, 390 offered courses called Health Science. Approximate total enrollment in the sample schools was 123,615 (Table 53, p. 37).

Table 54, p. 37, presents data regarding percentages of types of schools offering Health Science by regions. From this Table and from Tables 55, 56, 57, and 58 it is obvious that a course called Health Science is offered at many different grade levels. When offered in grades 7, 8, and 9 it is frequently a required course, often a half year in grades 7 and 8. When offered in grades 10, 11, and 12 it is reported most often as an elective but as a requirement in a few.

TABLE 53

FREQUENCY DISTRIBUTION OF STUDENTS

IN HEALTH SCIENCE BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	111	79.9	398	83.8	411	83.5	387	90.2	212	82.8	79	77.5	169	84.9	274	80.8	2041	84.0
99 or less	12	8.6	8	1.7	22	4.5	20	4.7	15	5.9	8	7.8	17	8.5	18	5.3	120	4.9
100-199	6	4.3	22	4.6	22	4.5	8	1.9	7	2.7	3	2.9	4	2.0	7	2.1	79	3.2
200-299	3	2.2	22	4.6	13	2.6	5	1.1	7	2.7	3	2.9	2	1.0	11	3.2	66	2.7
300-399	2	1.4			7	1.4	2	0.5	10	3.9	2	2.0			3	0.9	26	1.1
400-499	1	0.7	9	1.9	4	0.8	3	0.7					2	1.0	7	2.1	26	1.1
500-599	2	1.4	5	1.1	4	0.8	2	0.5			2	2.0	2	1.0	8	2.3	25	1.0
600-699			1	0.2	3	0.6	1	0.2			1	1.0	1	0.5	7	2.1	14	0.6
700-up	2	1.4	10	2.1	6	1.2	1	0.2	5	2.0	4	3.9	2	1.0	4	1.2	34	1.4
Totals	139	99.9	475	100.0	492	99.9	429	100.0	256	100.0	102	100.0	199	99.9	339	100.0	2431	100.0
	N = 28		N = 77		N = 81		N = 42		N = 44		N = 23		N = 30		N = 65			
Total Students	6,411		32,513		23,526		8,624		11,608		6,930		8,525		25,478		123,615	

TABLE 54

PERCENTAGE OF SCHOOLS OFFERING HEALTH SCIENCE

BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-9		12	5	3	16	7	3	26
7-12		20	41	18	21			
9-12	13	18	11	6	9	13	9	2
10-12	18	17	10	8	14	29	11	19

TABLE 55

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HEALTH SCIENCE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (7-9) JUNIOR HIGH SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 116		N = 63		N = 95		N = 64		N = 40		N = 37		N = 50	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	102	87.9	60	95.2	92	96.8	54	84.3	37	92.5	36	97.3	37	74.0
1-9%							2	3.1					1	2.0
10-19%	2	1.7							1	2.5			1	2.0
20-29%	3	2.6											2	4.0
30-39%	5	4.3	3	4.7	2	2.1	5	7.8	2	5.0	1	2.7	9	18.0
40-49%														
50%-up	4	3.4			1	1.0	3	4.7						
Totals	116	99.9	63	99.9	95	99.9	64	99.9	40	100.0	37	100.0	50	100.0

TABLE 56

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HEALTH SCIENCE ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains	
Percent of Student Population	N = 69		N = 41		N = 51		N = 62	
	No.	%	No.	%	No.	%	No.	%
0	55	79.7	24	58.5	42	82.3	49	79.0
1-9%	1	1.5			4	7.8	2	3.2
10-19%	6	8.7	6	14.6	3	5.9	2	3.2
20-29%	3	4.3	4	9.8	1	2.0	2	3.2
30-39%	4	5.8	4	9.8			6	9.7
40%-up			3	7.3	1	2.0	1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	99.9

TABLE 57

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HEALTH SCIENCE ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	34	87.2	83	82.2	112	88.9	68	94.4	54	91.5	27	87.1	43	91.5	121	97.6
1-9%	5	12.8	18	17.8	13	10.3	4	5.6	5	8.5	4	12.9	4	8.5	3	2.4
10-19%					1	0.8										
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

TABLE 58

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HEALTH SCIENCE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	32	82.0	84	83.1	113	89.7	66	91.6	51	86.4	22	71.0	42	89.4	100	80.6
1-9%	3	7.7	2	2.0	3	2.4	4	5.6	4	6.8	3	9.7	4	8.5	10	8.1
10-19%	2	5.1	2	2.0	2	1.6	1	1.4	1	1.7			1	2.1	5	4.0
20-29%	1	2.6	3	3.0	1	0.8	1	1.4			1	3.2				
30-39%	1	2.6	9	8.9	5	3.9			2	3.4	4	12.9			8	6.5
40%-up			1	1.0	2	1.6			1	1.7	1	3.2			1	0.8
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Biology

Of the sample schools, approximately 73 percent of the schools offered courses called Biology. Approximate total enrollment in the sample schools was 511,688 (Table 59, p. 39).

TABLE 59

FREQUENCY DISTRIBUTION OF STUDENTS IN BIOLOGY BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	20	14.4	138	29.1	59	12.0	150	35.0	83	32.4	36	35.3	59	29.7	54	16.1	599	24.7
99 or less	8	5.8	72	15.1	99	20.1	74	17.2	89	34.8	28	27.4	33	16.7	35	10.4	438	18.0
100-199	18	12.9	63	13.3	108	22.0	70	16.3	34	13.3	7	6.9	26	13.1	76	22.6	402	16.6
200-299	26	18.7	68	14.3	70	14.2	60	14.0	14	5.4	14	13.7	14	7.0	63	18.8	329	13.6
300-399	29	20.9	49	10.3	57	11.6	25	5.8	14	5.4	7	6.9	13	6.5	37	11.0	231	9.5
400-499	14	10.1	24	5.0	38	7.7	19	4.4	9	3.5	5	4.9	13	6.5	29	8.6	151	6.2
500-599	12	8.6	20	4.2	23	4.7	10	2.3	3	1.2	3	2.9	14	7.0	18	5.3	103	4.2
600-699	8	5.8	17	3.6	13	2.6	7	1.6	3	1.2	2	2.0	8	4.0	15	4.5	73	3.0
700-799	1	0.7	5	1.1	8	1.6	7	1.6					6	3.0	6	1.8	33	1.4
800-up	3	2.1	19	4.0	17	3.5	7	1.6	7	2.7			13	6.5	3	0.9	69	2.8
Totals	139	100.0	475	100.0	492	100.0	429	99.8	256	99.9	102	100.0	199	100.0	336	100.0	2428	100.0
Total Students	42,616		103,894		119,336		68,143		32,743		13,445		49,561		81,950		511,688	

Table 60, p. 40, presents data regarding percentages of types of schools offering Biology by regions. From this Table and from Tables 61, 62, 63, and 64, pp. 40-41, it is obvious that Biology is offered most frequently in high schools. The data from the Tables and an examination of questionnaires indicated that approximately 90 percent of the high schools offered Biology, most frequently in grade 10. Biology is also offered in many junior high schools. Data from questionnaires indicated it was most frequently offered in grades 7 and 9.

TABLE 60

PERCENTAGE OF SCHOOLS OFFERING BIOLOGY

BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-9		29	48	20	17	35	30	18
7-12		66	95	86	92			
9-12	95	92	91	89	92		92	93
10-12	92	91	82	89	88	90	85	89

TABLE 61

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BIOLOGY ENROLLMENTS OF TOTAL

POPULATION IN THREE YEAR (7-9) JUNIOR HIGH SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 116		Great Lakes N = 63		Southeast N = 95		Plains N = 64		Rocky Mountains N = 40		Southwest N = 37		Farwest N = 50	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	82	70.7	33	52.4	76	80.0	53	82.8	26	65.0	26	70.3	41	82.0
1-9%	26	22.4	11	17.5	14	14.7	6	9.3	11	27.5	7	18.9	5	10.0
10-19%	1	0.9	9	14.3	4	4.2	1	1.6	2	5.0	2	5.4	1	2.0
20-29%			7	11.1			1	1.6	1	2.5	1	2.7	1	2.0
30-39%	7	6.0	3	4.7	1	1.0	3	4.7			1	2.7	2	4.0
Totals	116	100.0	63	100.0	95	99.9	64	100.0	40	100.0	37	100.0	50	100.0

TABLE 62

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BIOLOGY ENROLLMENTS OF TOTAL

POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	10	14.5	2	4.9	7	13.7	5	8.0
1-9%	7	10.1	4	9.7	10	19.6	6	9.7
10-19%	46	66.7	31	75.6	25	49.0	45	72.6
20-29%	5	7.2	4	9.7	7	13.7	5	8.0
30-39%					1	2.0		
40%-up	1	1.5			1	2.0	1	1.6
Totals	69	100.0	41	99.9	51	100.0	62	99.9

TABLE 63

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BIOLOGY ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
Percent of Student Population	N = 80		N = 142		N = 267		N = 104		N = 52		N = 86		N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	4	5.0	12	8.5	23	8.6	11	10.6	4	7.7	7	8.1	11	6.7
1-9%	2	2.3	7	4.9	14	5.2	6	5.8	2	3.8	5	5.8	37	22.6
10-19%	19	23.8	47	33.1	94	35.2	25	24.0	24	46.2	16	18.6	72	43.9
20-29%	42	52.5	55	38.7	114	42.7	49	47.1	19	36.5	47	54.7	38	23.2
30-39%	13	16.3	18	12.7	20	7.5	10	9.6	1	1.9	9	10.5	6	3.6
40-49%			1	0.7	1	0.4	1	0.9	1	1.9	1	1.1		
50-59%			1	0.7	1	0.4	1	0.9						
60%-up			1	0.7			1	0.9	1	1.9	1	1.1		
Totals	80	99.9	142	100.0	267	100.0	104	99.8	52	99.9	86	99.9	164	100.0

TABLE 64

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BIOLOGY ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	3	7.7	9	8.9	23	18.3	8	11.1	7	11.9	3	9.7	7	14.9	14	11.3
1-9%	2	5.1	4	4.0	18	14.3	2	2.8	7	11.9					13	10.5
10-19%	2	5.1	20	19.8	25	19.8	11	15.3	8	13.5	6	19.3	2	4.3	34	27.4
20-29%	14	35.9	24	23.8	32	25.4	16	22.2	19	32.2	11	35.5	10	21.2	36	29.0
30-39%	17	43.6	36	35.6	25	19.8	24	33.3	17	28.8	8	25.8	22	46.8	23	18.5
40-49%	1	2.6	7	6.9	3	2.4	9	12.5	1	1.7	2	6.5	3	6.4	2	1.6
50%-up			1	1.0			2	2.8			1	3.2	3	6.4	2	1.6
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	99.9

Earth Science

Of the sample schools approximately 40 percent offered courses called Earth Science. Approximate total enrollment in the sample schools was 164,548 (Table 65, p. 42).

Table 66, p. 42, presents data regarding percentages of types of schools offering Earth Science. From this Table and from Tables 67, 68, 69, and 70, pp. 43-44, it is evident that Earth Science courses are offered more frequently in grades 7-9. Analyses of questionnaires indicated Earth Science was offered most frequently in grade 9.

TABLE 65

FREQUENCY DISTRIBUTION OF STUDENTS

IN EARTH SCIENCE BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	76	54.7	222	46.7	302	61.4	283	66.0	141	55.1	50	49.0	135	67.8	247	72.8	1456	59.9
99 or less	25	18.0	112	23.6	90	18.3	48	11.2	50	19.5	21	20.6	21	10.6	61	18.0	428	17.6
100-199	23	16.5	55	11.6	55	11.2	36	8.4	21	8.2	14	13.7	15	7.5	21	6.2	240	9.9
200-299	7	5.0	42	8.8	20	4.1	27	6.3	15	5.8	10	9.8	13	6.5	6	1.8	140	5.8
300-399	3	2.2	26	5.5	15	3.0	19	4.4	13	5.1	4	3.9	11	5.5	2	0.6	93	3.8
400-499			9	1.9	5	1.0	10	2.3	9	3.5	3	2.9	2	1.0	1	0.3	39	1.6
500-up	5	3.6	9	1.9	5	1.0	6	1.4	7	2.8			2	1.0	1	0.3	35	1.4
Totals	139	100.0	475	99.9	492	100.0	429	100.0	256	100.0	102	99.9	199	99.9	339	100.0	2431	100.0
	N = 63		N = 253		N = 190		N = 146		N = 115		N = 52		N = 64		N = 92			
Total Students	10,064		41,672		27,586		29,272		26,655		8,188		12,316		8,795		164,548	

TABLE 66

PERCENTAGE OF SCHOOLS OFFERING EARTH SCIENCE

BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-9		53	44	57	80	85	68	32
7-12		61	24	47	60			
9-12	57	64	42	24	27		14	30
10-12	20	40	25	6	8	13	21	14

TABLE 67

FREQUENCY DISTRIBUTION OF PERCENTAGE OF EARTH SCIENCE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (7-9) JUNIOR HIGH SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 116		Great Lakes N = 63		Southeast N = 95		Plains N = 64		Rocky Mountains N = 40		Southwest N = 37		Farwest N = 99	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	54	46.6	35	55.6	41	43.2	13	20.3	6	15.0	12	32.4	34	68.0
1-9%	24	20.7	6	9.5	9	9.5	8	12.5	10	25.0	2	5.4	5	10.0
10-19%	2	1.7	1	1.6	6	6.3	2	3.1	7	17.5	2	5.4	2	4.0
20-29%	9	7.8	4	6.3	3	3.2	4	6.3			2	5.4	1	2.0
30-39%	25	21.5	16	25.4	35	36.8	35	54.7	16	40.0	18	48.6	8	16.0
40%-up	2	1.7	1	1.6	1	1.0	2	3.1	1	2.5	1	2.7		
Totals	116	100.0	63	100.0	95	100.0	64	100.0	40	100.0	37	99.9	50	100.0

TABLE 68

FREQUENCY DISTRIBUTION OF PERCENTAGE OF EARTH SCIENCE ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	27	39.1	31	75.6	27	52.9	25	40.3
1-9%	17	24.6	5	12.2	3	5.9	1	1.6
10-19%	21	30.4	4	9.8	14	27.5	34	54.8
20-29%	4	5.8	1	2.4	5	9.8	1	1.6
30%-up					2	3.9	1	1.6
Totals	69	99.9	41	100.0	51	100.0	62	99.9

TABLE 69

FREQUENCY DISTRIBUTION OF PERCENTAGE OF EARTH SCIENCE ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	34	42.5	51	35.9	155	58.0	79	76.0	38	73.1	74	86.0	115	70.1
1-9%	22	27.5	53	37.3	80	30.0	15	14.4	6	11.5	8	9.3	43	26.2
10-19%	19	23.7	21	14.8	26	9.7	5	4.8	6	11.5	3	3.5	3	1.8
20-29%	5	6.3	10	7.0	5	1.9	4	3.9	2	3.9	1	1.1	3	1.8
30%-up			7	4.9	1	0.4	1	0.9						
Totals	80	100.0	142.	99.9	267	100.0	104	100.0	52	100.0	86	99.9	164	99.9

TABLE 70

FREQUENCY DISTRIBUTION OF PERCENTAGE OF EARTH SCIENCE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
ercent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	31	79.5	61	60.4	95	75.4	68	94.4	54	91.5	27	87.1	37	78.7	107	86.3
1-9%	6	15.4	27	26.7	26	20.6	4	5.6	2	3.4	3	9.7	7	14.9	15	12.1
10-19%	2	5.1	8	7.9	3	2.4			2	3.4	1	3.2	3	6.4	2	1.6
20-29%			3	3.0					1	1.7						
30%-up			2	2.0	2	1.6										
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Geology

Of the sample schools approximately 4 percent offered courses called Geology. Approximate total enrollment in the sample schools was (Table 71, p. 44).

Table 72, p. 45, presents data regarding percentages of types of schools offering Geology. From this Table and from Tables 73, 74, and 75, pp. 45-46, it can be seen that Geology is offered most frequently in high schools, particularly in grades 10-12. More schools in the western portion of the U.S. offer Geology than do other sections of the U.S., though there are areas in other sections of the U.S. where Geology is frequently offered.

TABLE 71

FREQUENCY DISTRIBUTION OF STUDENTS IN GEOLOGY BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	134	96.4	463	97.5	482	98.0	420	97.9	247	96.5	88	86.2	184	92.5	312	92.0	2330	95.8
99 or less	5	3.6	8	1.7	7	1.4	5	1.1	4	1.5	11	10.8	10	5.0	21	18.0	71	2.9
100-199			2	0.4	2	0.4	2	0.5	2	0.8	2	2.0	1	0.5	3	0.9	14	0.6
200-299			1	0.2	1	0.2					1	1.0	3	1.5	1	0.3	7	0.3
300-up			1	0.2			2	0.5	3	1.2			1	0.5	2	0.6	9	0.4
Totals	139	100.0	475	100.0	492	100.0	429	100.0	256	100.0	102	100.0	199	100.0	339	99.8	2431	100.0
Total Students	134		1,820		689		1,331		3,885		917		1,601		4,972		15,349	

TABLE 72

PERCENTAGE OF SCHOOLS OFFERING GEOLOGY

BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
	%	%	%	%	%	%	%	%
7-12		1	0	4	5			
9-12	1	4	2	1	4		6	6
10-12	5	3	2	6	3	32	11	9

TABLE 73

FREQUENCY DISTRIBUTION OF PERCENTAGE OF GEOLOGY ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	68	98.5	41	100.0	49	96.0	59	95.2
1-9%	1	1.5			1	2.0		
10%-up					1	2.0	3	4.8
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 74

FREQUENCY DISTRIBUTION OF PERCENTAGE OF GEOLOGY ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	79	98.7	136	95.8	261	97.8	103	99.0	50	96.2	81	94.2	154	93.9
1-9%	1	1.3	5	3.5	6	2.2	1	0.9			4	4.7	10	6.1
10-19%			1	0.7					2	3.8	1	1.1		
Totals	80	100.0	142	100.0	267	100.0	104	99.9	52	100.0	86	100.0	164	100.0

TABLE 75

FREQUENCY DISTRIBUTION OF PERCENTAGE OF GEOLOGY ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	37	94.9	98	97.0	124	98.4	68	94.4	57	96.6	21	67.7	42	89.4	113	91.1
1-9%	2	5.1	3	3.0	1	0.8	4	5.6	2	3.4	9	29.0	5	10.6	9	7.3
10%-up					1	0.8					1	3.2			2	1.6
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	99.9	47	100.0	124	100.0

Chemistry

Of the sample schools, approximately 69 percent offered Chemistry courses. Approximate total enrollment in the sample schools was 214,824 (Table 76, p. 46).

Table 77, p. 47, presents data regarding percentages of types of schools offering Chemistry. From this Table and from Tables 78, 79, and 80, pp. 47-48, it is obvious that Chemistry is offered most frequently in high schools. The data from the Tables and an examination of questionnaires indicated that approximately 90 percent of the high schools offered Chemistry, most frequently at grade 11.

TABLE 76

FREQUENCY DISTRIBUTION OF STUDENTS IN CHEMISTRY BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	18	12.9	180	35.8	91	18.5	192	42.4	99	38.7	51	50.0	72	36.2	65	19.2	748	30.8
99 or less	29	20.9	100	21.1	200	40.7	162	37.8	112	43.7	35	34.3	66	33.2	126	37.3	830	34.2
100-199	46	33.1	104	21.9	132	26.8	63	14.7	31	12.1	10	9.8	39	19.6	121	35.8	546	22.4
200-299	27	19.4	54	11.4	49	9.9	16	3.7	6	2.3	5	4.9	16	8.0	23	6.8	196	8.0
300-399	12	8.6	26	5.5	16	3.3	4	6.9	2	0.8	1	1.0	4	2.0	3	0.9	68	2.8
400-499	4	2.9	9	1.9	2	0.4	1	0.2	2	0.8			1	0.5			19	0.8
500-599	2	1.4	5	1.0	1	0.2			1	0.4							9	0.4
600-up	1	0.7	3	1.4	1	0.2	1	0.2	3	1.2			1	0.5			14	0.6
Totals	139	99.9	471	100.0	492	100.0	429	99.9	256	100.0	102	100.0	199	100.0	338	100.0	2430	100.0
Total Students	23,444		54,066		48,803		22,383		15,182		4,532		15,847		30,507		214,824	

TABLE 77

PERCENTAGE OF SCHOOLS OFFERING CHEMISTRY

BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-12		85	83	84	87			
9-12	96	92	92	88	92		94	92
10-12	95	92	82	92	90	90	89	89

TABLE 78

FREQUENCY DISTRIBUTION OF PERCENTAGE OF CHEMISTRY ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	10	14.5	6	14.6	8	15.7	8	12.9
1-9%	45	65.2	34	82.9	35	68.6	48	77.4
10-19%	14	20.3	1	2.4	6	11.8	5	8.1
20-29%					2	3.9	1	1.6
Totals	69	100.0	41	99.9	51	100.0	62	100.0

TABLE 79

FREQUENCY DISTRIBUTION OF PERCENTAGE OF CHEMISTRY ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	3	3.8	11	7.7	21	7.8	12	11.5	4	7.7	5	5.8	14	8.5
1-9%	21	26.2	57	40.1	166	62.2	71	68.3	39	75.0	52	60.5	133	81.1
10-19%	50	62.5	65	45.8	78	29.2	18	17.3	9	17.3	24	27.9	17	10.4
20-29%	6	7.5	7	4.9	2	0.8	1	0.9			1	1.1		
30%-up			2	1.4			2	1.8			4	4.7		
Totals	80	100.0	142	99.9	267	100.0	104	99.8	52	100.0	86	100.0	164	100.0

TABLE 80

FREQUENCY DISTRIBUTION OF PERCENTAGE OF CHEMISTRY ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 39		Mideast N = 101		Great Lakes N = 126		Southeast N = 72		Plains N = 59		Rocky Mountains N = 31		Southwest N = 47		Farwest N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	2	5.1	8	7.9	22	17.5	6	8.3	6	10.2	3	9.7	5	10.6	14	11.3
1-9%	6	15.4	13	12.9	49	38.9	31	43.1	22	37.3	13	41.9	21	44.7	86	69.4
10-19%	20	51.3	59	58.4	53	42.0	33	45.8	31	52.5	14	45.2	18	38.3	23	18.5
20-29%	9	23.1	18	17.8	1	0.8	2	2.8					2	4.3	1	0.8
30%-up	2	5.1	3	3.0	1	0.8					1	3.2	1	2.1		
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Physics

Of the sample schools, approximately 66 percent offered courses in Physics. Approximate total enrollment in the sample schools was 90,795 (Table 81, p. 48).

Table 82, p. 49, presents data regarding percentages of types of schools offering Physics. From this Table and from Tables 83, 84, and 85, pp. 49-50, it is obvious that Physics is offered most frequently in high schools. The data from the Tables and an examination of questionnaires indicated that approximately 85 percent of the high schools offered Physics, most frequently at grade 12.

TABLE 81

FREQUENCY DISTRIBUTION OF STUDENTS IN PHYSICS BY REGIONS

Students	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	22	15.8	172	36.2	109	20.3	204	47.5	111	43.4	57	55.9	91	45.7	80	23.7	837	34.4
99 or less	88	63.3	217	45.7	342	63.5	206	48.0	133	51.9	40	39.2	99	49.7	245	72.5	1370	56.4
100-199	27	19.4	69	14.5	46	9.7	17	4.0	7	2.7	4	3.9	8	4.0	13	3.8	191	7.9
200-299	2	1.4	9	1.9	1	0.2	2	0.5	2	0.8	1	1.0	1	0.5			18	0.7
300-399			4	0.8	1	0.7											5	0.2
400-up			4	0.8	2	0.4			3	1.2							9	0.4
Totals	139	99.9	475	99.9	492	99.9	429	100.0	256	100.0	102	100.0	199	100.0	338	100.0	2430	100.0
	N = 117		N = 303		N = 392		N = 225		N = 145		N = 45		N = 108		N = 259			
Total Students	8,533		24,450		20,602		8,244		8,240		1,947		4,971		13,718		90,795	

TABLE 82

PERCENTAGE OF SCHOOLS OFFERING PHYSICS

BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
	%	%	%	%	%	%	%	%
7-12		85	78	65	77			
9-12	92	90	89	83	81		81	88
10-12	90	91	82	83	86	94	87	86

TABLE 83

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PHYSICS ENROLLMENTS OF TOTAL

POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	10	14.5	9	21.9	18	35.3	14	22.6
1-9%	56	81.2	30	73.2	32	62.7	47	75.8
10-19%	3	4.3	2	4.9	1	2.0	1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 84

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PHYSICS ENROLLMENTS OF TOTAL

POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	6	7.5	14	9.9	29	10.9	18	17.3	10	19.2	16	18.6	20	12.2
1-9%	70	87.5	117	82.4	233	87.2	81	77.9	41	78.8	69	80.2	143	87.2
10-19%	4	5.0	9	6.3	4	1.5	3	2.9	1	1.9			1	0.6
20%-up			2	1.4	1	0.4	2	1.9			1	1.1		
Totals	80	100.0	142	100.0	267	100.0	104	100.0	52	99.9	86	99.9	164	100.0

TABLE 85

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PHYSICS ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England N = 39		Mideast N = 101		Great Lakes N = 126		Southeast N = 72		Plains N = 59		Rocky Mountains N = 31		Southwest N = 47		Farwest N = 124	
Percent of Student Population	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	4	10.3	8	8.9	22	17.5	12	16.7	8	13.6	2	6.4	6	12.8	17	13.7
1-9%	28	71.8	78	77.2	102	80.9	59	81.9	50	84.7	28	90.4	41	87.2	104	83.9
10-19%	7	17.9	11	10.9	1	0.8	1	1.4	1	1.7					2	1.6
20%-up			3	3.0	1	0.8					1	3.2			1	0.8
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Honors Programs

Of the sample schools, approximately 6 percent offered courses as Honors Programs. Approximate total enrollment in the sample schools was 10,070 (Table 86, p. 50).

Table 87, p. 51, presents data regarding percentages of types of schools offering Honors Programs. From this Table and from Tables 88, 89, 90 and 91, pp. 51-52, it can be seen that Honors Programs are available in all types of secondary schools. The programs are offered at all grade levels for students with interest and ability in science. Such courses are most frequently offered in larger schools, though some small schools do offer such courses too.

TABLE 86

FREQUENCY DISTRIBUTION OF STUDENTS IN HONORS PROGRAMS IN SCIENCE BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Student Enrollment	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	132	95.0	437	92.0	505	95.1	415	96.7	246	96.1	96	94.0	181	91.0	329	91.9	2341	94.1
99 or less	5	3.6	29	6.1	20	3.8	12	2.8	6	2.3	2	2.0	13	6.5	26	7.3	113	4.5
100-199	1	0.7	6	1.3	2	0.4	2	0.5	4	1.6	1	1.0	5	2.5	3	0.8	24	1.0
200-up	1	0.7	3	0.6	4	0.7					3	3.0					11	0.4
Totals	139	100.0	475	100.0	531	100.0	429	100.0	256	100.0	102	100.0	199	100.0	358	100.0	2489	100.0
	N = 7		N = 38		N = 26		N = 14		N = 10		N = 6		N = 18		N = 29			
Total Students	690		2,899		2,210		665		659		388		1,252		1,307		10,070	

TABLE 87

PERCENTAGE OF SCHOOLS OFFERING HONORS

BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
	%	%	%	%	%	%	%	%
7-9		8	3	2	6	7	16	6
7-12		7	2	2	3			
9-12	4	11	4	3	0		7	9
10-12	5	7	6	4	2	3	11	6

TABLE 88

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HONORS SCIENCE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (7-9) JUNIOR HIGH SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 116		N = 63		N = 95		N = 64		N = 40		N = 37		N = 50	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	107	92.2	61	96.8	93	97.9	60	93.7	37	92.5	31	83.8	47	94.0
1-9%	6	5.2	2	3.2	2	2.1	3	4.7	1	2.5	3	8.1	3	6.0
10-19%	2	1.7					1	1.6	2	5.0	3	8.1		
20-29%	1	0.9												
Totals	116	100.0	63	100.0	95	100.0	64	100.0	40	100.0	37	100.0	50	100.0

TABLE 89

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HONORS SCIENCE ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains	
Percent of Student Population	N = 69		N = 41		N = 51		N = 62	
	No.	%	No.	%	No.	%	No.	%
0	64	92.7	40	97.6	50	98.0	60	96.8
1-9%	4	5.8	1	2.4	1	2.0	2	3.2
10-19%	1	1.4						
Totals	69	99.9	41	100.0	51	100.0	62	100.0

TABLE 90

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HONORS ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
	N = 80		N = 142		N = 267		N = 104		N = 52		N = 86		N = 164	
Percent of Student Population	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	77	96.2	127	89.4	255	95.5	101	97.1	52	100.0	80	93.0	150	91.5
1-9%	3	3.8	14	9.9	11	4.1	3	2.9			6	7.0	14	8.5
10-19%			1	0.7	1	0.4								
Totals	80	100.0	142	100.0	267	100.0	104	100.0	52	100.0	86	100.0	164	100.0

TABLE 91

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HONORS ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
Percent of Student Population	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	37	94.9	94	93.1	118	93.6	69	95.8	58	98.3	30	96.8	42	89.4	117	94.4
1-9%	2	5.1	7	6.9	6	4.8	3	4.2	1	1.7	1	3.2	5	10.6	7	5.6
10-19%					2	1.6										
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Advanced Biology

Of the sample schools, approximately 31 percent offered a course in Advanced Biology. Approximate total enrollment in the sample schools was 27,753 (Table 92, p. 53).

Table 93, p. 53, presents data regarding percentages of types of schools offering Advanced Biology. From this Table and Tables 94, 95, and 96, p. 54, it can be seen that this course is most frequently offered in high schools. Other analyses indicate it is offered most frequently in larger schools. The Advanced Biology course was usually offered for students in grades 11 and 12 who had already completed one year of Biology. Many schools had other requirements including completion of Chemistry, a grade of B or better in Biology, etc.

TABLE 92

FREQUENCY DISTRIBUTION OF STUDENTS

IN ADVANCED BIOLOGY BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Student Enrollment	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	65	46.8	317	66.7	329	62.0	351	81.8	199	77.7	77	75.5	139	69.9	249	69.5	1726	69.4
99 or less	69	49.6	147	31.4	196	36.9	75	17.5	53	20.7	24	24.5	56	28.1	102	28.5	724	29.1
100-199	4	2.9	7	1.5	6	1.1	2	0.3	4	1.6			2	1.0	6	1.7	31	1.2
200-up	1	0.7	3	0.4			1	0.2					2	1.0	1	0.3	7	0.3
Totals	139	100.0	475	100.0	531	100.0	429	100.0	256	100.0	101	100.0	199	100.0	358	100.0	2488	100.0
	N = 74		N = 158		N = 202		N = 78		N = 57		N = 24		N = 60		N = 109			
Total Students	2,933		5,867		6,569		2,934		1,990		702		2,487		4,171		27,753	

TABLE 93

PERCENTAGE OF SCHOOLS OFFERING ADVANCED BIOLOGY

BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
	%	%	%	%	%	%	%	%
7-12		26	49	14	26			
9-12	53	45	42	28	29		37	31
10-12	59	53	39	40	37	48	49	40

TABLE 94

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ADVANCED BIOLOGY ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains	
Percent of Student Population	N = 69		N = 41		N = 51		N = 62	
	No.	%	No.	%	No.	%	No.	%
0	51	73.9	21	51.2	44	86.3	45	72.6
1-9%	18	26.1	20	48.8	7	13.7	16	25.8
10-19%							1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 95

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ADVANCED BIOLOGY ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
Percent of Student Population	N = 80		N = 142		N = 267		N = 104		N = 52		N = 86		N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	38	47.5	78	54.9	154	57.7	75	72.1	37	71.2	54	62.8	113	68.9
1-9%	42	52.5	63	44.4	110	41.2	28	26.9	14	26.9	30	34.9	49	29.9
10-19%					3	1.1	1	0.9	1	1.9	1	1.1	2	1.2
20-29%			1	0.7							1	1.1		
Totals	80	100.0	142	100.1	267	100.0	104	99.9	52	100.0	86	99.9	164	100.0

TABLE 96

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ADVANCED BIOLOGY ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	16	41.0	47	46.5	77	61.1	43	59.7	37	62.7	16	51.6	24	51.1	75	60.5
1-9%	22	56.4	53	52.5	49	38.9	28	38.9	22	37.3	14	45.2	23	48.9	47	37.9
10-19%	1	2.6	1	1.0			1	1.4			1	3.2			2	1.6
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Advanced Chemistry

Of the sample schools, approximately 17 percent offered a course in Advanced Chemistry. Approximate total enrollment in the sample schools was 8,590 (Table 97, p. 55).

Table 98, p. 55, presents data regarding percentages of types of schools offering Advanced Chemistry. From this Table and Tables 99, 100, and 101, pp. 56, it can be seen that this course is offered in high schools. Other analyses indicate it is offered most frequently in large schools. The Advanced Chemistry course was usually offered for students in grades 11 and 12 who had already completed one year of Chemistry. The number of schools offering Advanced Chemistry was considerably less than Advanced Biology. The number of students enrolled during a year also was smaller than enrollments in Advanced Biology.

TABLE 97

FREQUENCY DISTRIBUTION OF STUDENTS

IN ADVANCED CHEMISTRY BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Student Enrollment	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	106	76.3	376	79.2	403	75.9	392	91.3	224	87.5	86	86.0	161	80.9	315	88.0	2063	82.9
99 or less	33	23.7	99	20.8	126	23.7	36	8.4	29	11.3	14	14.0	37	18.6	43	12.0	417	16.8
100-up					2	0.4	1	0.2	3	1.2			1	0.5			7	0.3
Totals	139	100.0	475	100.0	531	100.0	429	99.9	256	100.0	100	100.0	199	100.0	358	100.0	2487	100.0
	N = 33		N = 99		N = 128		N = [illegible]		N = 32		N = 14		N = 38		N = 43			
Total Students	469		1,860		2,784		787		896		210		750		834		8,590	

TABLE 98

PERCENTAGE OF SCHOOLS OFFERING ADVANCED CHEMISTRY

BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
	%	%	%	%	%	%	%	%
7-12		9	12	4	8			
9-12	16	23	25	89	13		17	7
10-12	28	34	31	19	20	32	30	18

TABLE 99

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ADVANCED CHEMISTRY ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	63	91.3	36	87.8	49	96.1	57	91.9
1-9%	6	8.7	5	12.2	2	3.9	4	6.5
10%-up							1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 100

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ADVANCED CHEMISTRY ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	67	83.7	109	76.8	201	75.3	93	89.4	45	86.5	71	82.6	153	93.3
1-9%	13	16.3	33	23.2	66	24.7	11	10.6	6	11.5	15	17.4	11	6.7
10-19%									1	1.9				
Totals	80	100.0	142	100.0	267	100.0	104	100.0	52	99.9	86	100.0	164	100.0

TABLE 101

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ADVANCED CHEMISTRY ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 39		Mideast N = 101		Great Lakes N = 126		Southeast N = 72		Plains N = 59		Rocky Mountains N = 31		Southwest N = 47		Farwest N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	28	71.8	67	66.3	87	69.0	58	80.6	47	79.7	21	67.7	33	70.2	102	82.3
1-9%	11	28.2	33	32.7	38	30.2	14	19.4	12	20.3	10	32.3	14	29.8	22	17.7
10-19%			1	1.0	1	0.3										
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Advanced Physics

Of the sample schools, approximately 7 percent offered a course in Advanced Physics. Approximate total enrollment in the sample schools was 3,355 (Table 102, p. 57).

Table 103, p. 57, presents data regarding percentages of types of schools offering Advanced Physics. From this Table and from Tables 104,105, and 106, pp. 58, it can be seen that this course is offered in high schools. Other analyses indicate it is offered most frequently in large schools. The Advanced Physics course is usually offered in grade 12 for students who had completed one year of Physics or Physical Science. The number of schools offering Advanced Physics is considerably less than those offering Advanced Biology and Advanced Chemistry. Advanced Physics classes also tend to be smaller than the other types of advanced science courses.

TABLE 102

FREQUENCY DISTRIBUTION OF STUDENTS

IN ADVANCED PHYSICS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Student Enrollment	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	122	87.8	428	90.1	486	91.5	412	96.0	245	96.7	95	95.0	184	92.5	344	96.1	2316	93.1
99 or less	17	12.2	47	9.9	44	8.3	17	4.0	8	3.1	5	5.0	14	7.0	14	3.9	166	6.7
100-up					1	0.2			3	1.2			1	0.5			5	0.2
Totals	139	100.0	475	100.0	531	100.0	429	100.0	256	100.0	100	100.0	199	100.0	358	100.0	2487	100.0
Total Students	323		790		893		314		373		74		372		211		3,355	

TABLE 103

PERCENTAGE OF SCHOOLS OFFERING ADVANCED PHYSICS

BY SCHOOL TYPES BY REGIONS

	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
School Types	%	%	%	%	%	%	%	%
7-12		3	5	2	2			
9-12	18	10	6	3	2		7	2
10-12	13	18	11	6	9	13	9	2

TABLE 104

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ADVANCED PHYSICS ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	67	97.1	39	95.1	50	98.0	61	98.4
1-9%	2	2.9	2	4.9	1	2.0	1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 105

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ADVANCED PHYSICS ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	74	82.5	128	90.1	252	94.4	101	97.1	51	98.1	80	93.0	160	97.6
1-9%	6	17.5	14	9.9	15	5.6	3	2.9	1	1.9	6	7.0	4	2.4
Totals	80	100.0	142	100.0	267	100.0	104	100.0	52	100.0	86	100.0	164	100.0

TABLE 106

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ADVANCED PHYSICS ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	34	87.2	83	82.2	112	88.9	68	94.4	54	91.5	27	87.1	43	91.5	121	97.6
1-9%	5	12.8	18	17.8	13	10.3	4	5.6	5	8.5	4	12.9	4	8.5	3	2.4
10-19%	0	0.0	0	0.0	1	0.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Science Course Improvement Projects

Enrollments in science course improvement projects are presented and listed by project. Information regarding the number of schools that did or did not use the materials in their school curriculum and the percentage of their students who were enrolled in a course using the materials during the 1970-71 school year are given.

Introductory Physical Science

Of the sample schools, approximately 31 percent of the schools offered Introductory Physical Science. Approximate total enrollment in the sample schools was 84,500 (Table 107, p. 59).

Table 108, p. 60, presents data regarding percentages of types of schools offering Introductory Physical Science by regions. From this Table and from Tables 109, 110, 111, and 112, pp.60-61, and from an examination of questionnaires, IPS was offered most frequently in grades 8, 9, and 10. While distribution varied in different areas of the country, junior high schools offered IPS more frequently than did other types of schools. IPS was also taught more frequently in large schools.

TABLE 107

FREQUENCY DISTRIBUTION OF INTRODUCTORY

PHYSICAL SCIENCE (IPS) ENROLLMENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	65	58.6	202	76.6	342	72.3	109	63.1	80	52.6	41	62.1	50	68.5	208	74.0	1044	68.8
99 or less	23	20.7	24	9.1	61	12.6	22	14.3	16	10.5	9	13.6	5	6.8	39	13.9	192	12.6
100-199	12	10.8	13	4.9	27	6.7	17	10.1	26	17.1	5	7.6	5	6.8	20	7.1	125	8.2
200-299	7	6.3	12	4.5	16	4.0	7	4.1	13	8.6	6	9.1	3	4.1	6	2.1	70	4.6
300-399	1	0.9	7	2.7	13	3.2	5	3.0	10	6.6	4	6.1	5	6.8	4	1.4	49	3.2
400-499	2	1.8	2	0.8	4	0.5	4	2.4	4	2.6	1	1.5	1	1.4	4	1.4	20	1.3
500-599	1	0.9	1	0.4	1	0.2	3	1.8	2	1.3			1	1.4			9	0.6
600+up			2	0.8	2	0.5	1	0.6	1	0.7			3	4.1			9	0.6
Totals	111	100.0	263	100.0	466	100.0	168	100.0	152	100.0	66	100.0	73	99.9	281	99.9	1516	99.9
Total Students	6,732		11,416		18,233		11,615		14,726		4,571		7,607		9,533		84,490	

TABLE 108

PERCENTAGE OF SCHOOLS OFFERING IPS

BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-9		17	43	23	56	50	19	26
7-12		13	10	2	29			
9-12	41	15	24	14	17		15	25
10-12	3	1	9	8	8	3	2	11

TABLE 109

FREQUENCY DISTRIBUTION OF PERCENTAGE OF IPS ENROLLMENTS OF TOTAL

POPULATION IN THREE YEAR (7-9) JUNIOR HIGH SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 116		Great Lakes N = 63		Southeast N = 95		Plains N = 64		Rocky Mountains N = 40		Southwest N = 37		Farwest N = 50	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	96	82.7	36	57.1	73	76.8	28	43.8	20	50.0	30	81.1	37	74.0
1-9%	6	5.2	12	19.0	10	10.5	2	3.1	6	15.0	1	2.7	1	2.0
10-19%	3	2.6	8	12.7	7	7.4	3	4.7	2	5.0	1	2.7	1	2.0
20-29%	3	2.6	2	3.2	5	5.3	7	10.9	2	5.0	2	5.4	2	4.0
30-39%	6	5.2	5	7.9			23	35.9	10	25.0	3	8.1	9	18.0
40%-up	2	1.7					1	1.6						
Totals	116	100.0	63	99.9	95	100.0	64	100.0	40	100.0	37	100.0	50	100.0

TABLE 110

FREQUENCY DISTRIBUTION OF PERCENTAGE OF IPS ENROLLMENTS OF TOTAL

POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	60	87.0	37	90.2	50	98.0	44	71.0
1-9%	5	7.2	1	2.4	1	2.0	2	3.2
10-19%	4	5.8	3	7.3			12	19.3
20%-up							4	6.5
Totals	69	100.0	41	99.9	51	100.0	62	100.0

TABLE 111

FREQUENCY DISTRIBUTION OF PERCENTAGE OF IPS ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
Percent of Student Population	N = 80		N = 142		N = 267		N = 104		N = 52		N = 86		N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	47	58.7	121	85.2	203	76.0	89	85.6	43	82.7	73	84.8	123	75.0
1-9%	15	18.7	9	6.3	30	11.2	6	5.8	2	3.9	4	4.7	27	16.5
10-19%	12	15.0	4	2.8	20	7.5	2	1.9	1	1.9	4	4.7	9	5.5
20-29%	5	6.3	7	4.9	13	4.9	5	4.8	6	11.5	4	4.7	4	2.4
30%-up	1	1.3	1	0.7	1	0.4	2	1.9			1	1.1	1	0.6
Totals	80	100.0	142	99.9	267	100.0	104	100.0	52	100.0	86	100.0	164	100.0

TABLE 112

FREQUENCY DISTRIBUTION OF PERCENTAGE OF IPS ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	38	97.4	100	99.0	115	91.3	66	91.6	54	91.5	30	96.8	46	97.9	111	89.5
1-9%	1	2.6	1	1.0	9	7.1	6	8.3	4	6.8			1	2.1	12	9.7
10-19%					2	1.6			1	1.7	1	3.2			1	0.8
Totals	39	100.0	101	100.0	126	100.0	72	99.9	59	100.0	31	100.0	47	100.0	124	100.0

Earth Science Curriculum Project (ESCP)

Of the sample schools, approximately 19 percent of the schools taught ESCP courses. Approximate total enrollment in the sample schools was 41,900 (Table 113, p. 62).

Table 114, p. 62, presents data regarding percentages of types of schools offering ESCP by regions. From this Table and from Tables 115, 116, 117, and 118, pp.63-64, and from examinations of questionnaires, ESCP was offered most frequently in grade 9 and next most frequently in grades 8 and 10. Comments from respondents indicated that a large number of schools were considering the course especially for the ninth grade for the 1971-72 school year.

TABLE 113

FREQUENCY DISTRIBUTION OF EARTH SCIENCE

CURRICULUM PROJECT (ESCP) ENROLLMENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	84	75.7	139	75.7	345	85.4	139	92.7	110	72.4	45	68.2	59	80.8	245	87.2	1226	80.8
99 or less	21	18.9	35	14.4	21	5.2	14	8.3	14	9.2	10	15.1	5	6.8	24	8.5	147	9.7
100-199	4	3.6	11	4.2	22	5.4	7	4.1	6	3.9	5	7.6	5	6.8	11	3.9	71	4.7
200-299	1	0.9	9	3.4	10	2.5	5	3.0	11	7.2	4	6.1	3	4.1	1	0.4	44	2.9
300-399			1	0.4	6	1.5	1	0.6	8	5.3	1	1.5					17	1.1
400 up	1	0.9	5	1.6			2	1.2	3	2.0	1	1.5	1	1.4			13	0.9
Totals	111	100.0	201	100.0	404	100.0	168	99.9	152	100.0	66	100.0	73	99.9	281	100.0	1518	100.0
Total Students	3,521		8,856		8,500		4,410		8,845		2,624		2,166		2,977		41,905	

TABLE 114

PERCENTAGE OF SCHOOLS OFFERING ESCP

BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-9		17	14	10	39	40	11	12
7-12		16	2	0	16			
9-12	25	19	13	7	10		7	14
10-12	5	4	9	1	0	3	6	2

TABLE 115

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ESCP ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (7-9) JUNIOR HIGH SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 116		N = 63		N = 95		N = 64		N = 40		N = 37		N = 50	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	9[illegible]	82.7	54	85.7	86	90.5	39	60.9	24	60.0	33	89.2	44	88.0
1-9%	1[illegible]	10.3	4	6.3	4	4.2	2	3.1	6	15.0	2	5.4	4	8.0
10-19%	1	0.9			2	2.1	4	6.2	4	10.0			1	2.0
20-29%	4	3.5	1	1.6			4	6.2			1	2.7		
30%-up	3	2.6	4	6.3	3	3.2	15	23.4	6	15.0	1	2.7	1	2.0
Totals	116	100.0	63	99.9	95	100.0	64	99.8	40	100.0	37	100.0	50	100.0

TABLE 116

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ESCP ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains	
Percent of Student Population	N = 69		N = 41		N = 51		N = 62	
	No.	%	No.	%	No.	%	No.	%
0	59	85.5	40	97.6	51	100.0	52	83.9
1-9%	7	10.1					1	1.6
10-19%	3	4.4	1	2.4			8	12.9
20-29%							1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 117

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ESCP ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
Percent of Student Population	N = 80		N = 142		N = 267		N = 104		N = 52		N = 86		N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	60	75.0	115	81.0	231	86.5	97	93.2	47	90.4	80	93.0	141	86.0
1-9%	11	13.7	17	12.0	26	9.7	4	3.9	1	1.9	3	3.5	20	12.2
10-19%	7	8.7	7	4.9	10	3.7	3	2.9	3	5.8	2	2.3	2	1.2
20-29%	1	1.3	2	1.4					1	1.9	1	1.1	1	0.6
30%-up	1	1.3	1	0.7										
Totals	80	100.0	142	100.0	267	99.9	104	100.0	52	100.0	86	99.9	164	100.0

TABLE 118

FREQUENCY DISTRIBUTION OF PERCENTAGE OF ESCP ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	37	94.9	97	96.0	115	91.3	71	98.6	59	100.0	30	96.8	44	93.6	119	97.6
1-9%	2	5.1	4	4.0	8	6.3	1	1.4			1	3.2	2	4.3	3	2.4
10-19%					3	2.4							1	2.1		
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Biological Sciences Curriculum Study (BSCS Green)

Of the sample schools, approximately 27 percent of the schools taught BSCS Green Biology. Approximate total enrollment in the sample schools was 85,400 (Table 119, p. 64).

Table 120, p. 65, presents data regarding percentages of types of schools offering BSCS Green Biology by regions. From this Table, from Tables 121, 122, and 123, pp. 65-66, and from analyses of questionnaires it can be determined that BSCS Green Biology was offered primarily in high schools and at the tenth grade level. BSCS Green was offered more frequently than BSCS Blue in all regions except the New England region. Size of school was not related to BSCS Green being offered. Location of school (urban vs. rural) also was not strongly related to whether BSCS Green Biology was offered.

TABLE 119

FREQUENCY DISTRIBUTION OF BIOLOGICAL SCIENCE CURRICULUM STUDY (BSCS) GREEN VERSION ENROLLMENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	86	77.5	191	72.6	333	82.4	112	66.7	108	71.0	36	54.5	59	80.8	179	63.7	1105	72.8
99 or less	14	12.6	29	11.0	28	6.9	15	8.9	19	12.5	13	19.7	4	5.5	19	6.7	141	9.3
100-199	7	6.3	27	10.3	20	5.0	17	10.1	12	7.9	4	6.1	5	6.8	32	11.4	124	8.2
200-299			5	1.9	9	2.2	7	4.2	8	5.2	7	10.6	1	1.4	20	7.1	57	3.7
300-399	1	0.9	7	2.7	5	1.2	9	5.4	1	0.7	3	4.5			12	4.3	38	2.5
400-499	1	0.9	1	0.4	4	1.0	3	1.8	1	0.7	2	3.0	1	1.4	14	5.0	27	1.8
500-up	2	1.8	3	1.1	5	1.2	5	3.0	3	2.0	1	1.5	3	4.1	5	1.8	26	1.7
Totals	111	100.0	263	100.0	404	99.9	168	99.9	152	100.0	66	99.9	73	100.0	281	100.0	1518	100.0
Total Students	3,704		11,952		14,277		12,182		11,732		5,202		4,079		23,135		85,363	

TABLE 120

PERCENTAGE OF SCHOOLS OFFERING BSCS GREEN

BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-12		20	7	18	16			
9-12	17	21	17	23	21		5	29
10-12	18	21	14	14	32	48	15	42

TABLE 121

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BSCS GREEN ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	55	79.7	38	92.7	42	82.3	52	83.9
1-9%	8	11.6	1	2.4	4	7.8	3	4.8
10-19%	6	8.7	2	4.9	3	5.9	6	9.7
20%-up					2	3.9	1	1.6
Totals	69	100.0	41	100.0	51	99.9	62	100.0

TABLE 122

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BSCS GREEN ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	66	82.5	112	78.9	221	82.8	80	76.9	41	78.9	82	95.3	117	71.3
1-9%	7	8.7	13	9.2	19	7.1	7	6.7	3	5.8	2	2.3	22	13.4
10-19%	5	6.3	8	5.6	15	5.6	6	5.8	6	11.5			17	10.4
20-29%	2	2.5	9	6.3	9	3.4	10	9.6	2	3.8	2	2.3	8	4.9
30-39%					3	1.1	1	0.9						
Totals	80	100.0	142	100.0	267	100.0	104	99.9	52	100.0	86	99.9	164	100.0

TABLE 123

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BSCS GREEN ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	32	82.0	80	79.2	108	85.7	62	86.0	40	67.8	16	51.6	40	85.1	72	58.1
1-9%	4	10.3	9	8.9	8	6.3	4	5.6	5	8.5	2	6.4	2	4.3	14	11.3
10-19%	2	5.1	8	7.9	4	3.2	1	1.4	8	13.5	6	19.5	1	2.1	22	17.7
20-29%			3	3.0	5	3.9	3	4.2	4	6.8	5	16.1	1	2.1	12	9.7
30-39%	1	2.6	1	1.0			2	2.8	2	3.4	1	3.2	3	6.4	3	2.4
40%-up					1	0.8					1	3.2			1	0.8
Totals	39	100.0	101	100.0	126	99.9	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Biological Sciences Curriculum Study (BSCS Blue)

Of the sample schools, approximately 20 percent of the schools taught BSCS Blue Biology. Approximate total enrollment in the sample schools was 60,210 (Table 124, p. 66).

Table 125, p. 67, presents data regarding percentages of types of schools offering BSCS Blue Biology by regions. From this Table and from Tables 126, 127, and 128, pp.67-68, and from analyses of questionnaires it is obvious that BSCS Blue Biology is offered primarily in high schools and at grade 10. BSCS Blue Biology was offered more frequently in large schools than small. It was also offered more frequently in urban than rural schools. It was also offered more frequently in the New England region of the U.S. as compared to other regions.

TABLE 124

FREQUENCY DISTRIBUTION OF BIOLOGICAL SCIENCE CURRICULUM STUDY (BSCS) BLUE VERSION ENROLLMENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	64	57.7	210	79.8	336	83.2	140	83.3	128	84.2	60	90.9	64	87.7	215	76.5	1217	80.2
99 or less	34	30.6	31	11.8	35	8.7	17	10.1	9	5.9	3	4.5	4	5.5	30	10.7	163	10.7
100-199	10	9.0	11	4.2	13	3.2	6	3.6	6	3.9	1	1.5			14	5.0	61	4.0
200-299	1	0.9	7	2.7	7	1.7			1	0.7	1	1.5	1	1.3	13	4.6	31	2.0
300-up	2	1.8	4	1.5	13	3.2	5	3.0	8	5.3	1	1.5	4	5.5	9	3.2	46	3.0
Totals	111	100.0	263	100.0	404	100.0	168	100.0	152	100.0	66	99.9	73	100.0	281	100.0	1518	99.9
Total Students	3,518		13,419		12,117		3,543		14,048		514		2,630		10,421		60,210	

TABLE 125

PERCENTAGE OF SCHOOLS OFFERING BSCS BLUE

BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	%	Southwest %	Farwest %
7-12		14	5	2	3				
9-12	31	14	14	5	11			7	21
10-12	26	15	18	18	25	16		6	23

TABLE 126

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BSCS BLUE ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains	
Percent of Student Population	N = 69		N = 41		N = 51		N = 62	
	No.	%	No.	%	No.	%	No.	%
0	59	85.5	39	95.1	50	98.0	60	96.8
1-9%	8	11.6	1	2.4	1	2.0		
10-19%	2	2.9					1	1.6
20-29%			1	2.4			1	1.6
Totals	69	100.0	41	99.9	51	100.0	62	100.0

TABLE 127

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BSCS BLUE ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
Percent of Student Population	N = 80		N = 142		N = 267		N = 104		N = 52		N = 86		N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	55	68.7	122	85.9	229	85.8	99	95.2	46	88.5	80	93.0	130	79.3
1-9%	18	22.5	14	9.9	18	6.7	4	3.9	3	5.8	1	1.1	21	12.8
10-19%	5	6.3	5	3.5	14	5.2	1	0.9	2	3.8	1	1.1	10	6.1
20%-up	2	2.5	1	0.7	6	2.2			1	1.9	4	4.7	3	1.8
Totals	80	100.0	142	100.0	267	99.9	104	100.0	52	100.0	86	99.9	164	100.0

TABLE 128

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BSCS BLUE ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 39		Mideast N = 101		Great Lakes N = 126		Southeast N = 72		Plains N = 59		Rocky Mountains N = 31		Southwest N = 47		Farwest N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	29	74.4	86	85.1	103	81.7	59	81.9	44	74.6	26	83.9	44	93.6	95	76.6
1-9%	7	17.9	9	8.9	16	12.7	5	6.9	4	6.8	3	9.7	1	2.1	19	15.3
10-19%	2	5.1	3	3.0	5	3.9	4	5.6	2	3.4	2	6.4			7	5.6
20-29%	1	2.6	2	2.0	1	0.8	2	2.8	1	1.7			1	2.1	3	2.4
30%-up			1	1.0	1	0.8	2	2.8	8	13.5			1	2.1		
Totals	39	100.0	101	100.0	126	99.9	72	100.0	59	100.0	31	100.0	47	99.9	124	99.9

Biological Sciences Curriculum Study (BSCS Yellow)

Of the sample schools, approximately 27 percent of the schools taught BSCS Yellow Biology. Approximate total enrollment in the sample schools was 84,600 (Table 129, p. 68).

Table 130, p. 69, presents data regarding percentages of types of schools offering BSCS Yellow Biology by regions. From this Table, from Tables 131, 132, and 133, pp. 69-70, and from analyses of questionnaires it can be established that BSCS Yellow Biology was taught primarily in high schools. Use of BSCS Yellow was at about the same level as BSCS Green though regions where BSCS Yellow was being used differed. BSCS Yellow was used more heavily in the New England region than in other regions. Use was lowest in the Plains, Rocky Mountains and the Southeast. There was little relationship of BSCS Yellow to size of school or location of school (urban; rural).

TABLE 129

FREQUENCY DISTRIBUTION OF BIOLOGICAL SCIENCE CURRICULUM STUDY (BSCS) YELLOW VERSION ENROLLMENTS BY REGIONS

Students Per School	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	60	54.1	188	71.5	291	72.0	129	76.8	130	85.5	52	78.8	53	72.6	202	71.9	1105	72.8
99 or less	29	26.1	32	12.2	34	8.4	20	11.9	7	4.6	6	9.1	8	11.0	27	9.6	163	10.7
100-100	12	10.8	23	8.7	29	7.1	12	7.1	8	5.3	2	3.0	5	6.8	22	7.8	113	7.4
200-299	7	6.3	8	3.0	12	3.0	3	1.8	4	2.6	2	3.0	1	1.4	12	4.3	49	3.2
300-399	2	1.8	9	3.4	20	5.0	1	0.6	2	1.3	1	1.5	1	1.4	9	3.2	45	3.0
400-up	1	0.9	3	1.1	18	4.4	3	1.8	1	0.7	3	4.5	5	6.8	9	3.2	43	2.8
Totals	111	100.0	263	99.9	404	100.0	168	100.0	152	100.0	66	99.9	73	100.0	281	100.0	1518	99.9
	N = 51		N = 75		N = 113		N = 39		N = 22		N = 14		N = 20		N = 79			
Total Students	6,500		11,069		25,725		6,507		11,163		2,869		4,218		16,547		84,598	

TABLE 130

PERCENTAGE OF SCHOOLS OFFERING BIOLOGICAL SCIENCE CURRICULUM STUDY YELLOW BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-12		13.0	12.2	9.8	12 9			
9-12	37.5	21.1	22.5	11.5	3.8		14.0	20.7
10-12	41.0	23.8	24.6	18.1	17.0	29.0	10.6	31.5

TABLE 131

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BSCS YELLOW ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains	
Percent of Student Population	N = 69		N = 41		N = 51		N = 62	
	No.	%	No.	%	No.	%	No.	%
0	60	87.0	36	87.8	46	90.2	54	87.1
1-9%	6	8.7	3	7.3	2	3.9	2	3.2
10-19%	3	4.3	2	4.9	3	5.9	4	6.5
20%-up							2	3.2
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 132

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BSCS YELLOW ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
Percent of Student Population	N = 80		N = 142		N = 267		N = 104		N = 52		N = 86		N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	50	62.5	112	78.9	207	77.5	92	88.5	50	96.2	74	86.0	130	79.3
1-9%	24	30.0	12	8.4	19	7.1	10	9.6	2	3.8	6	7.0	20	12.2
10-19%	4	5.0	16	11.3	30	11.2					2	2.3	8	4.9
20-29%	2	2.5	1	0.7	10	3.7	2	1.9			4	4.7	4	2.4
30%-up			1	0.7	1	0.4							2	1.2
Totals	80	100.0	142	100.0	267	99.9	104	100.0	52	100.0	86	100.0	164	100.0

TABLE 133

FREQUENCY DISTRIBUTION OF PERCENTAGE OF BSCS YELLOW ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	23	59.0	77	76.2	95	75.4	59	81.9	49	83.0	22	71.0	42	89.4	85	68.5
1-9%	7	17.9	12	11.9	14	11.1	9	12.5			2	6.4	1	2.1	15	12.1
10-19%	8	20.5	10	9.9	7	5.5	2	2.8	6	10.2	3	9.7	1	2.1	14	11.3
20-29%	1	2.6	1	1.0	7	5.5	1	1.4	2	3.4	1	3.2	1	2.1	6	4.8
30-39%			1	1.0	3	2.4	1	1.4	1	1.7	3	9.7	2	4.3	3	2.4
40%-up									1	1.7					1	0.8
Totals	39	100.0	101	100.0	126	99.9	72	100.0	59	100.0	31	100.0	47	100.0	124	99.9

Chemical Education Materials Study (CHEMS)

Of the sample schools, approximately 34 percent of the schools taught CHEMS. Total enrollment in the sample schools was 58,627 (Table 134, p. 70).

Table 135, p. 71, presents data regarding percentages of types of schools offering CHEMS by regions. From this Table and from Tables 136, 137, and 138, pp. 71, and from analyses of questionnaires, it can be seen that CHEMS was taught primarily in high school at grades 11 and 12. The percentage of schools using CHEMS was highest in New England and in the Farwest regions. Use of CHEMS far exceeded use of CBA in all areas.

TABLE 134

FREQUENCY DISTRIBUTION OF CHEMICAL EDUCATION MATERIALS STUDY (CHEMS) ENROLLMENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Students Per School	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	54	48.6	188	71.4	290	71.8	131	78.0	100	65.8	49	74.2	53	72.6	142	50.5	1007	66.3
99 or less	40	36.0	49	18.6	45	11.1	19	11.3	32	21.0	11	16.7	10	13.7	70	24.9	276	18.2
100-199	9	8.1	16	6.1	44	10.9	10	5.9	14	9.2	4	6.1	5	6.8	53	18.9	155	10.2
200-299	6	5.4	7	2.7	20	5.0	4	2.4	3	2.0	2	3.0	2	2.7	14	5.0	58	3.8
300-399	1	0.9	2	0.8	5	1.2	3	1.8					2	2.7	2	0.7	15	1.0
400-up	1	0.9	1	0.4			1	0.6	3	2.0			1	1.4			7	0.5
Totals	111	99.9	263	100.0	404	100.0	168	100.0	152	100.0	66	100.0	73	99.9	281	100.0	1518	100.0
	N = 57		N = 75		N = 114		N = 37		N = 52		N = 17		N = 20		N = 139			
Total Students	5,477		7,576		15,366		4,965		5,707		1,375		2,606		15,555		58,627	

TABLE 135

PERCENTAGE OF SCHOOLS OFFERING CHEMS BY SCHOOL TYPES BY REGIONS

School Types	New England %	Mideast %	Great Lakes %	Southeast %	Plains %	Rocky Mountains %	Southwest %	Farwest %
7-12		11.6	4.9	5.9	14.5			
9-12	41.3	21.1	26.6	6.7	23.0		12.7	44.5
10-12	38.4	28.7	30.9	27.8	49.1	32.3	14.9	50.0

TABLE 136

FREQUENCY DISTRIBUTION OF PERCENTAGE OF CHEMS ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

	Mideast		Great Lakes		Southeast		Plains	
Percent of Student Population	N = 69		N = 41		N = 51		N = 62	
	No.	%	No.	%	No.	%	No.	%
0	61	88.4	39	95.1	48	94.1	53	85.5
1-9%	8	11.6	2	4.9	2	3.9	8	12.9
10%-up					1	2.0	1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 137

FREQUENCY DISTRIBUTION OF PERCENTAGE OF CHEMS ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Southwest		Farwest	
Percent of Student Population	N = 80		N = 142		N = 267		N = 104		N = 52		N = 86		N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	47	58.7	112	78.9	196	73.4	97	93.3	40	76.9	75	87.2	91	55.5
1-9%	28	35.0	20	14.1	59	22.1	5	4.8	10	19.2	7	8.1	64	39.0
10%-up	5	6.3	10	7.0	12	4.5	2	1.9	2	3.8	4	4.6	9	5.5
Totals	80	100.0	142	100.0	267	100.0	104	100.0	52	99.9	86	99.9	164	100.0

TABLE 138

FREQUENCY DISTRIBUTION OF PERCENTAGE OF CHEMS ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest	
Percent of Student Population	N = 39		N = 101		N = 126		N = 72		N = 59		N = 31		N = 47		N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	24	61.5	72	71.3	87	69.0	52	72.2	30	50.8	21	67.7	40	85.1	62	50.0
1-9%	8	20.5	20	19.8	24	19.0	11	15.3	17	28.8	7	22.6	5	10.6	51	41.1
10-19%	5	12.8	7	6.9	15	11.9	9	12.5	12	20.3	3	9.7	1	2.1	11	8.9
20-29%	2	5.1	2	2.0									1	2.1		
Totals	39	99.9	101	100.0	126	99.9	72	100.0	59	99.9	31	100.0	47	99.9	124	100.0

Chemical Bond Approach (CBA)

Of the sample schools, approximately 4 percent of the schools taught CBA. Total enrollment in the sample schools was 4,920 (Table 139).

Table 140 presents data regarding percentages of types of schools offering CBA by regions. From this Table and from Tables 141, 142, and 143, pp 72-73, and from analyses of questionnaires, it is clear that CBA Chemistry is not taught extensively. The questionnaires analyzed, indicated it was taught more frequently in larger schools than in small schools. The number of schools, however, is small limiting this generalization.

TABLE 139

FREQUENCY DISTRIBUTION OF CHEMICAL BOND APPROACH (CBA) ENROLLMENTS BY REGIONS

Students Per School	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	98	88.3	251	95.4	395	97.8	163	97.0	146	96.1	60	90.9	73	100.0	268	95.4	1454	95.8
99 or less	12	10.8	8	3.0	8	2.0	4	2.4	4	2.6	3	4.5			8	2.8	47	3.1
100-up	1	0.9	4	1.5	1	0.2	1	0.6	2	1.3	3	4.5			5	1.8	17	1.1
Totals	111	100.0	263	99.9	404	100.0	168	100.0	152	100.0	66	99.9	73	100.0	281	100.0	1518	100.0
	N = 13		N = 12		N = 9		N = 5		N = 6		N = 6		N = 0		N = 13			
Total Students	945		1,299		503		256		593		382				942		4,920	

TABLE 140

PERCENTAGE OF SCHOOLS OFFERING CHEMICAL BOND APPROACH BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Farwest
	%	%	%	%	%	%	%
7-12		2.9		3.9	1.6		
9-12	8.7	4.9	1.9	1.9	3.8		4.3
10-12	12.8	2.0	3.2	[illegible]	1.7	12.9	4.0

TABLE 141

FREQUENCY DISTRIBUTION OF PERCENTAGE OF CBA ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	67	97.1	41	100.0	49	96.1	61	98.4
1-9%	2	2.9			2	3.9	1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 142

FREQUENCY DISTRIBUTION OF PERCENTAGE OF CBA ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	73	91.3	135	95.1	262	98.1	103	99.0	50	96.2	86	100.0	157	95.7
1-9%	7	8.7	6	4.2	4	1.5	1	0.9	1	1.9			7	4.3
10%-up			1	0.7	1	0.4			1	1.9				
Totals	80	100.0	142	100.0	267	100.0	104	99.9	52	100.0	86	100.0	164	100.0

TABLE 143

FREQUENCY DISTRIBUTION OF PERCENTAGE OF CBA ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 39		Mideast N = 101		Great Lakes N = 126		Southeast N = 72		Plains N = 59		Rocky Mountains N = 31		Southwest N = 47		Farwest N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	34	87.2	99	98.0	122	96.8	70	97.2	58	98.3	27	87.1	47	100.0	119	96.0
1-9%	4	10.2	2	2.0	3	2.4	1	1.4	1	1.7	3	9.7			5	4.0
10%-up	1	2.6			1	0.8	1	1.4			1	3.2				
Ttoals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Physical Science Study Committee (PSSC)

Of the sample schools, approximately 33 percent of the schools taught PSSC Physics. Total enrollment in the sample schools was 25,831 (Table 144, p. 74).

Table 145, p. 74, presents data regarding percentages of types of schools offering PSSC Physics by regions. From this Table, from Tables 146, 147, and 148, pp. 75, and from questionnaires analyzed, it is clear PSSC Physics is taught in high schools primarily at grades 11 and 12. The percentage of schools teaching PSSC Physics is highest in the New England and Far West regions and lowest in the Southeast region.

TABLE 144

FREQUENCY DISTRIBUTION OF PHYSICAL SCIENCE STUDY COMMITTEE (PSSC) ENROLLMENTS BY REGIONS

Students Per School	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	55	49.5	183	69.6	289	71.5	139	82.7	112	73.7	49	74.2	46	63.0	152	54.1	1025	67.5
99 or less	53	47.7	70	26.6	98	24.3	27	16.1	32	21.0	14	21.2	25	34.2	126	44.8	445	29.3
100-199	2	1.8	9	3.4	16	4.0	2	1.2	3	2.0	3	4.5	2	2.7	3	1.1	40	2.6
200-up	1	0.9	1	0.4	1	0.2			5	3.3							8	0.5
Totals	111	99.9	263	100.0	404	100.0	168	100.0	152	100.0	66	99.9	73	99.9	281	100.0	1518	99.9
	N = 56		N = 80		N = 115		N = 29		N = 30		N = 17		N = 27		N = 129			
Total Students	2,420		4,750		6,339		1,294		3,386		720		1,315		5,607		25,831	

TABLE 145

PERCENTAGE OF SCHOOLS OFFERING PHYSICAL SCIENCE STUDY COMMITTEE BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
	%	%	%	%	%	%	%	%
7-12		13.0		5.9	12.9			
9-12	40.0	27.5	27.4	7.7	5.7		12.8	43.9
10-12	41.0	25.7	31.7	19.4	47.5	38.7	27.7	41.9

TABLE 146

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PSSC ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	60	87.0	41	100.0	48	94.1	54	87.1
1-9%	9	13.0			3	5.9	7	11.3
10%-up							1	1.6
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 147

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PSSC ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	48	60.0	103	72.5	194	72.6	96	92.3	49	94.3	75	87.2	92	56.1
1-9%	31	38.7	37	26.1	72	27.0	8	7.7	2	3.8	11	12.8	71	43.3
10-19%			1	0.7	1	0.4							1	0.6
20%-up	1	1.3	1	0.7					1	1.9				
Totals	80	100.0	142	100.0	267	100.0	104	100.0	52	100.0	86	100.0	164	100.0

TABLE 148

FREQUENCY DISTRIBUTION OF PERCENTAGE OF PSSC ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 39		Mideast N = 101		Great Lakes N = 126		Southeast N = 72		Plains N = 59		Rocky Mountains N = 31		Southwest N = 47		Farwest N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	23	59.0	75	74.3	86	68.3	58	80.6	31	52.5	19	61.3	34	72.3	72	58.1
1-9%	16	41.0	26	25.7	39	30.9	14	19.4	26	44.1	11	35.5	13	27.7	52	41.9
10-19%					1	0.8			2	3.4	1	3.2				
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Harvard Project Physics (HPP)

Of the sample schools, approximately 12 percent of the schools taught HPP Physics. Total enrollment in the sample schools was approximately 10,850 (Table 149, p. 76).

Table 150, p. 76, presents data regarding percentages of types of schools offering HPP Physics by regions. From this table, from Tables 151, 152, and 153, p. 77, and from analyses of questionnaires it is apparent that Project Physics is being taught most frequently in grades 10, 11, and 12. The use of Project Physics materials is quite high considering the short period of time the materials have been available.

TABLE 149

FREQUENCY DISTRIBUTION OF PROJECT PHYSICS

ENROLLMENT BY REGIONS

Students Per School	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		U.S.Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	93	83.8	239	90.9	362	89.6	152	90.5	132	86.8	58	87.9	68	93.2	237	84.3	1341	88.3
99 or less	17	15.3	20	7.6	37	9.2	14	8.3	19	12.5	7	10.6	3	4.1	41	14.6	158	10.4
100-Up	1	0.9	4	1.5	5	1.2	2	1.2	1	0.7	1	1.5	2	2.7	3	1.1	19	1.3
Totals	111	100.0	263	100.0	404	100.0	168	100.0	152	100.0	66	100.0	73	100.0	281	100.0	1518	100.0
Total Students	N = 18		N = 24		N = 42		N = 16		N = 20		N = 8		N = 5		N = 44		N = 177	
	1,000		1,600		2,600		1,000		1,100		500		450		2,600		10,850	

TABLE 150

PERCENTAGE OF SCHOOLS OFFERING HPP

BY SCHOOL TYPES BY REGIONS

School Types	New England	Mideast	Great Lakes	Southeast	Plains	Rocky Mountains	Southwest	Farwest
	%	%	%	%	%	%	%	%
7-12		3	2	4	7			
9-12	13	8	11	2	8		5	13
10-12	21	10	8	7	19	13	2	16

TABLE 151

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HPP ENROLLMENTS OF TOTAL POPULATION IN SIX YEAR (7-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	Mideast N = 69		Great Lakes N = 41		Southeast N = 51		Plains N = 62	
	No.	%	No.	%	No.	%	No.	%
0	67	97.1	40	97.6	49	96.1	58	93.5
1-9%	2	2.9	1	2.4	2	3.9	4	6.5
Totals	69	100.0	41	100.0	51	100.0	62	100.0

TABLE 152

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HPP ENROLLMENTS OF TOTAL POPULATION IN FOUR YEAR (9-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 80		Mideast N = 142		Great Lakes N = 267		Southeast N = 104		Plains N = 52		Southwest N = 86		Farwest N = 164	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	70	87.5	131	92.3	237	88.8	102	98.1	48	92.3	82	95.3	142	86.6
1-9%	10	12.5	11	7.7	29	10.8	2	1.9	4	7.7	4	4.7	22	13.4
10-19%					1	0.4								
Totals	80	100.0	142	100.0	267	100.0	104	100.0	52	100.0	86	100.0	164	100.0

TABLE 153

FREQUENCY DISTRIBUTION OF PERCENTAGE OF HPP ENROLLMENTS OF TOTAL POPULATION IN THREE YEAR (10-12) SECONDARY SCHOOLS BY REGIONS

Percent of Student Population	New England N = 39		Mideast N = 101		Great Lakes N = 126		Southeast N = 72		Plains N = 59		Rocky Mountains N = 31		Southwest N = 47		Farwest N = 124	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	31	79.5	91	90.1	116	92.1	67	93.1	48	81.4	27	87.1	46	97.9	104	83.9
1-9%	8	20.5	9	8.9	9	7.1	5	6.9	11	18.6	3	9.7	1	2.1	19	15.3
10-19%			1	1.0	1	0.8					1	3.2			1	0.8
Totals	39	100.0	101	100.0	126	100.0	72	100.0	59	100.0	31	100.0	47	100.0	124	100.0

Schools Teaching Environmental Education or Conservation Education

Each principal was asked to indicate if environmental education or conservation education was taught in his school. Data on Table 154 indicates that at the time of the study environmental education was being taught in approximately 63 percent of the schools. Emphasis was the greatest in the New England, Farwest and Rocky Mountain areas. Emphasis was lowest in the Southeast and Southwest. A random sample of those indicating a negative response were contacted to determine if the item elicited the information desired. The check indicated no significant difference between their original responses and second responses.

Further questions were asked to determine the emphasis given to environmental education.

TABLE 154

FREQUENCY OF SCHOOLS TEACHING ENVIRONMENTAL/CONSERVATION EDUCATION BY REGIONS

	New England N = 137		Mideast N = 473		Great Lakes N = 496		Southeast N = 401		Plains N = 243		Rocky Mountains N = 95		Southwest N = 192		Farwest N = 335		Total U.S. N = 2372	
Teaching EE or CE	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	37	27.0	136	28.8	203	40.9	195	48.6	102	42.0	30	31.6	93	48.4	91	27.2	887	37.4
Yes	100	73.0	337	71.2	293	59.1	206	51.4	141	58.0	65	68.4	99	51.6	244	72.8	1485	62.6
Totals	137	100.0	473	100.0	496	100.0	401	100.0	243	100.0	95	100.0	192	100.0	335	100.0	2372	100.0

Environmental Education as a Separate Subject

Data regarding schools teaching environmental education as a separate subject in the six grades of secondary schools is shown in Table 155. The data clearly indicate that few schools were teaching environmental education as a separate subject. When it is taught as a separate subject, it is offered most frequently in high schools.

TABLE 155

PERCENTAGE OF SCHOOLS TEACHING ENVIRONMENTAL EDUCATION AS A SEPARATE SUBJECT BY GRADES AND BY REGIONS

	New England N = 139		Mideast N = 475		Great Lakes N = 529		Southeast N = 429		Plains N = 253		Rocky Mountains N = 102		Southwest N = 199		Farwest N = 354		Total U.S. N = 2480	
Grade Level	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7	1	0.7	5	1.1	2	0.4	2	0.5	3	1.2	4	3.9					23	0.9
8	2	1.4	5	1.1	4	0.8	2	0.5	1	0.4	1	1.0			1	0.3	21	0.8
9	5	3.6	11	2.3	18	3.4	3	0.7	2	0.8	1	1.0			9	2.5	55	2.2
10	5	3.6	13	2.7	38	7.2	4	0.9	3	1.2	1	1.0			21	5.9	91	3.7
11	13	9.3	15	3.2	47	8.9	7	1.6	2	0.8	2	2.0			29	8.2	121	4.9
12	14	10.1	20	4.2	49	9.3	8	1.9	1	0.4	3	2.9	1	0.5	29	8.2	125	5.1

Environmental Education in Science Courses

Data regarding schools that included units or content in environmental education within the science curriculum is shown by grades in Table 156. Principals reported it was included in seventh grade science courses in 15.2 percent of the schools and in the eighth grade in 16.5 percent of the schools. At the ninth grade 27.0 percent of the schools taught environmental education with science. This increased to 30.3 percent at the tenth grade and then decreased to 19.2 percent in the eleventh and 17.4 percent in the twelfth grade.

From these data it is evident that most students receive science-related environmental studies in grades nine and ten. Reviews of questionnaires indicate most of these experiences were offered by schools with earth science and biology.

TABLE 156

PERCENTAGE OF SCHOOLS TEACHING ENVIRONMENTAL EDUCATION WITH SCIENCE BY GRADES AND BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 139		N = 475		N = 529		N = 429		N = 253		N = 102		N = 193		N = 354		N = 2474	
Grade Level	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7	10	7.2	117	24.6	52	9.8	75	17.5	57	22.5	24	23.5	20	10.4	22	6.2	377	15.2
8	10	7.2	117	24.6	59	11.2	94	21.9	48	19.0	24	23.5	25	13.0	31	8.8	408	16.5
9	44	31.7	159	33.5	124	23.4	125	29.1	53	20.9	29	28.4	51	26.4	82	23.2	667	27.0
10	75	54.0	162	34.1	148	28.0	90	21.0	60	23.5	25	24.5	56	29.1	134	37.9	750	30.3
11	39	28.1	100	21.0	102	19.3	59	13.8	32	12.5	17	16.7	33	17.1	94	26.6	476	19.2
12	35	25.2	97	20.4	91	17.2	55	12.8	22	8.7	15	14.7	31	16.1	85	24.0	431	17.4

Environmental Education with Social Studies

Much less environmental education is taught with social studies education than with science. Data on Table 157, p. 80, indicates more integration with social studies as the grade level increases. At the twelfth grade level 11.0 percent of the schools included environmental education with their social studies courses. Again, variations occur among the regions, with the Southeast and Plains giving more emphasis to environmental education at the ninth grade. The percentages in the Rocky Mountains Region remains almost constant at all grade levels.

TABLE 157

PERCENTAGE OF SCHOOLS TEACHING ENVIRONMENTAL EDUCATION

WITH SOCIAL STUDIES BY GRADES AND BY REGIONS

Grade Level	New England N = 139		Mideast N = 475		Great Lakes N = 529		Southeast N = 429		Plains N = 254		Rocky Mountains N = 102		Southwest N = 193		Farwest N = 354		Total U.S. N = 2475	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7	2	1.4	31	6.5	16	3.0	23	5.4	20	7.8	8	7.8	6	3.1	9	2.5	115	4.6
8	3	2.2	34	7.2	19	3.6	21	4.9	18	7.1	10	9.8	5	2.6	13	3.7	123	5.0
9	11	7.9	47	9.9	27	5.1	33	7.7	26	10.3	9	8.8	11	5.7	49	13.8	213	8.6
10	12	8.6	34	7.2	35	6.6	25	5.8	18	7.1	8	7.8	16	8.3	52	14.7	200	8.1
11	16	11.5	45	9.5	43	8.1	26	6.1	22	8.7	10	9.8	24	12.4	60	16.9	246	9.9
12	26	18.7	48	10.1	55	10.4	22	5.1	25	9.8	9	8.8	22	11.4	65	18.4	272	11.0

Environmental Education with Two or More Subjects Including Science

Table 158 presents data regarding where environmental education was taught with two or more subjects including science. The highest percentage nationally was reported at the tenth grade level where 7.4 percent of the schools used this combination of subjects with environmental education. Among the regions, percentage variations occurred at all grade levels compared to the national averages. The percentages were higher for grades 7, 8 and 9 in the Mideast, Plains and Rocky Mountains. In the Farwest region percentages of schools using this combination of subjects was higher in grades 10, 11, and 12. These variations may be partly explained by differences of school types in the regions.

TABLE 158

PERCENTAGE OF SCHOOLS TEACHING ENVIRONMENTAL EDUCATION
WITH TWO OR MORE SUBJECTS INCLUDING SCIENCE
BY GRADES AND BY REGIONS

Grade Level	New England N = 139		Mideast N = 475		Great Lakes N = 529		Southeast N = 429		Plains N = 253		Rocky Mountains N = 102		Southwest N = 195		Farwest N = 354		U.S.Total N = 2474	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7	2	1.4	45	9.5	12	2.3	16	3.7	17	6.7	6	5.9	8	4.2	5	1.4	111	4.5
8	2	1.4	39	8.2	18	3.5	19	4.4	24	9.4	8	7.8	8	4.2	6	1.7	124	5.0
9	5	3.6	41	8.6	31	5.9	32	7.5	19	7.5	10	9.8	15	7.8	16	4.5	169	6.8
10	6	4.3	33	6.9	36	6.8	28	6.5	21	8.3	6	5.9	19	9.8	34	9.6	183	7.4
11	3	2.2	28	5.9	28	5.3	25	5.8	19	7.5	4	3.9	17	8.8	34	9.6	158	6.4
12	4	2.9	26	5.5	30	5.7	21	4.9	18	7.1	4	3.9	15	7.8	30	8.5	148	6.0

Environmental Education with Two or More Subjects Not Including Science

As can be seen in Table 159, environmental education is seldom taught in subject combinations that do not include science.

TABLE 159

PERCENTAGE OF SCHOOLS TEACHING ENVIRONMENTAL EDUCATION WITH TWO OR MORE SUBJECTS NOT INCLUDING SCIENCE BY GRADES AND BY REGIONS

Grade Level	Mideast N = 475		Great Lakes N = 529		Southeast N = 429		Plains N = 253		Rocky Mountains N = 102		Southwest N = 193		Farwest N = 354		Total U.S. N = 2335	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7	1	0.2	1	0.2	2	0.5							1	0.3	5	0.2
8	2	0.4	1	0.2	1	0.2							1	0.3	5	0.2
9	1	0.2	2	0.4	3	0.7					1	0.5	3	0.8	10	0.4
10			1	0.2	3	0.7					1	0.5	2	0.6	7	0.3
11			1	0.2	5	1.2	1	0.4	1	1.0	3	1.5	3	0.8	14	0.6
12	2	0.4	1	0.2	5	1.2	1	0.4	1	1.0	2	1.0	2	0.6	14	0.6

Special Facilities for Teaching Environmental Education

Only 19.9 percent of the principals reported having any special facilities for environmental education (Table 160). Among the regions a high of 28.4 percent of the schools was reported in the Great Lakes Region while a low of 9.1 percent was reported in the Southwest Region. Contacts with schools indicated nature trails and land laboratories were the most common facilities.

TABLE 160

PERCENTAGE OF SCHOOLS HAVING SPECIAL FACILITIES FOR TEACHING ENVIRONMENTAL EDUCATION BY REGIONS

Special Facilities	New England N = 139		Mideast N = 475		Great Lakes N = 529		Southeast N = 428		Plains N = 253		Rocky Mountains N = 102		Southwest N = 198		Farwest N = 354		Total U.S. N = 2478	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	110	79.1	405	85.3	379	71.6	366	85.5	209	82.6	78	76.5	180	90.9	257	72.6	1984	80.1
Yes	29	20.9	70	14.7	150	28.4	62	14.5	44	17.4	24	23.5	18	9.1	97	27.4	494	19.9
Totals	139	100.0	475	100.0	529	100.0	428	100.0	253	100.0	102	100.0	198	100.0	354	100.0	2478	100.0

Science Clubs

Considerable interest regarding the status of science clubs and science fairs has been expressed in contacts with ERIC/SMEAC staff. Table 161 presents responses that indicate that 63.4 percent of the schools had science clubs. Most regions were close to the national percentage. There were fewer science clubs in two regions, the Plains 53.1 percent and the Rocky Mountains 53.6 percent. The Farwest was highest with 74.9 percent of the schools sponsoring science clubs.

TABLE 161

PERCENTAGE OF SCHOOLS SPONSORING SCIENCE CLUBS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 138		N = 465		N = 568		N = 416		N = 245		N = 97		N = 196		N = 347		N = 2422	
Sponsor Science Club	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	46	33.3	176	37.8	190	36.7	152	36.5	115	46.9	45	46.3	75	38.3	87	25.1	886	36.6
Yes	92	66.7	289	62.2	378	63.3	264	63.5	130	53.1	52	53.6	121	61.7	260	74.9	1536	63.4
Totals	138	100.0	465	100.0	568	100.0	416	100.0	245	100.0	97	99.9	196	100.0	347	100.0	2422	100.0

Science Fairs

Principals were asked if their school sponsored a science fair for their own students. Data in Table 162 indicate only about 28 percent indicated having such fairs. Among the regions a low of 19.2 percent was found in the Farwest. The Southeast reported 46.8 percent and the Rocky Mountains 44.4 percent as having science fairs for their own students.

TABLE 162

PERCENTAGE OF SCHOOLS SPONSORING A SCIENCE FAIR

FOR THEIR OWN STUDENTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 137		N = 467		N = 514		N = 421		N = 246		N = 99		N = 194		N = 343		N = 2421	
Sponsor Fair	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	103	75.2	351	75.2	386	75.1	224	53.2	178	72.4	55	55.5	124	63.9	327	80.8	1748	72.2
Yes	34	24.8	116	24.8	128	24.9	197	46.8	68	27.6	44	44.4	70	36.1	16	19.2	673	27.8
Totals	137	100.0	467	100.0	514	100.0	421	100.0	246	100.0	99	99.9	194	100.0	343	100.0	2421	100.0

Principals were also asked to indicate if their students took part in science fairs with students from other schools during 1970-71. Of the 2,403 principals responding to this item, 47.9 percent answered affirmatively (Table 163). Among the regions, New England and the Mideast had the lowest percentages with 40.7 percent and 40.8 percent respectively. The highest percentage was in the Rocky Mountains with 62.2 percent of the schools reporting students taking part in this type of science fair.

TABLE 163

PERCENTAGE OF SCHOOLS WITH STUDENTS PARTICIPATING IN A SCIENCE FAIR WITH STUDENTS FROM OTHER SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 135		N = 458		N = 514		N = 413		N = 246		N = 98		N = 193		N = 346		N = 2403	
Participation in Fairs	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	80	59.3	271	59.2	278	54.1	173	41.9	143	58.1	37	37.7	84	43.5	187	54.0	1253	52.1
Yes	55	40.7	187	40.8	236	45.9	240	58.1	103	41.9	61	62.2	109	56.5	159	46.0	1150	47.9
Totals	135	100.0	458	100.0	514	100.0	413	100.0	246	100.0	93	99.9	193	100.0	346	100.0	2403	100.0

Supervisors and Consultants

Use of City or County Supervisors and Consultants

The use of different types of city or county supervisors or consultants is shown in Table 164. With 2,485 principals responding to this item it was found that about 36 percent of the schools had supervisory or consultant help available at the city or county level. About two-thirds of the supervisors or consultants were science specialists.

TABLE 164

FREQUENCY DISTRIBUTION OF USE OF CITY OR COUNTY SUPERVISORS BY TYPES AND BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 139		N = 475		N = 529		N = 429		N = 256		N = 102		N = 199		N = 356		N = 2485	
Use By Types of Supervisors	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Not Used	95	68.3	319	67.2	371	70.1	163	38.0	198	77.3	66	64.7	141	70.9	227	63.8	1580	63.6
Sci Specialist	28	20.1	98	20.6	95	18.0	142	33.1	44	17.2	18	17.6	36	18.1	72	20.7	533	21.4
Generalist	8	5.8	29	6.1	42	7.9	90	21.0	8	3.1	13	12.7	16	8.0	40	11.2	246	9.9
Combination	8	5.8	29	6.1	21	4.0	34	8.0	6	3.4	5	4.9	6	3.0	17	4.8	126	5.1
Totals	139	100.0	475	100.0	429	100.0	429	100.0	256	100.0	102	99.9	199	100.0	356	100.0	2485	100.0

Use of Supervisors and Consultants from State Department

Use of state department supervisors or consultants for science programs in the schools was relatively low. Of the 2,485 schools reporting (Table 165) about 25 percent did use them. Science supervisors from the state department were used by 16.4 percent of the schools while only 5.8 percent used general supervisors or consultants. Another 3.2 percent used a combination of state department supervision. A number of schools commented that the frequency of contact was not high and the duration of contact in most cases was very short.

TABLE 165

FREQUENCY DISTRIBUTION OF USE OF STATE DEPARTMENTS OF EDUCATION SUPERVISORS OR CONSULTANTS BY TYPES AND BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Use By Types of Supervisors	N = 139		N = 475		N = 529		N = 429		N = 256		N = 102		N = 199		N = 356		N = 2485	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Not Used	81	58.3	374	78.7	434	82.0	287	66.9	176	68.8	62	60.8	145	72.9	294	82.6	1853	74.6
Sci Specialist	44	31.6	62	13.1	57	10.8	96	22.4	51	19.9	24	23.5	36	18.1	38	10.6	408	16.4
Generalist	4	2.9	26	5.5	25	4.7	29	6.7	21	8.2	12	11.7	10	5.0	17	4.8	144	5.8
Combination	10	7.2	13	2.7	13	2.5	17	4.0	8	3.1	4	3.9	8	4.0	7	2.0	80	3.2
Totals	139	100.0	475	100.0	529	100.0	429	100.0	256	100.0	102	99.9	199	100.0	356	100.0	2485	100.0

Use of College or University Consultants

Use of college and university consultants was also low. Table 166 indicates that about 26 percent used college or university consultants in their science programs. Most consultants were science specialists.

TABLE 166

FREQUENCY DISTRIBUTION OF USE OF COLLEGE OR CONSULTANTS BY TYPES AND BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Use By Types of Supervisors	N = 139		N = 475		N = 529		N = 429		N = 256		N = 102		N = 199		N = 356		N = 2485	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Not Used	94	67.6	390	82.1	399	75.4	285	66.4	195	76.2	64	62.8	133	66.8	274	77.0	1834	73.8
Sci Specialist	33	23.7	62	13.1	93	17.6	108	25.2	45	17.6	25	24.5	45	22.6	61	17.1	472	19.0
Generalist	5	3.6	12	2.5	23	4.3	20	4.7	8	3.1	10	9.8	13	6.5	12	3.4	103	4.1
Combination	7	5.0	11	2.3	14	2.6	16	3.7	8	3.1	3	2.9	8	4.0	9	2.5	76	3.1
Totals	139	99.9	475	100.0	529	99.9	429	100.0	256	100.0	102	100.0	199	99.9	356	100.0	2485	100.0

In-Service Education for Science Teachers

Principals were asked to identify opportunities science teachers in their schools had for in-service science education. A summary of the percentages of various types of in-service education available to science teachers is shown in Table 167. Curriculum development and revision meetings were available in 88.1 percent of the schools. Workshops devoted to science teaching methods were reported in 74.4 percent of the schools. College or university science content courses were reported available to science teachers by 59.5 percent of the schools. Television and/or radio programs for science teachers were available at 33.5 percent of the schools.

Among the regions a few variations should be observed. College courses or workshops were more available in the Farwest, 71.4 percent, than in any other region. Television and radio programs for science teachers were least available in the Rocky Mountains and the Great Lakes with 22.0 percent and 23.3 percent respectively.

TABLE 167

FREQUENCY DISTRIBUTION OF IN-SERVICE EDUCATION OPPORTUNITIES

FOR SCIENCE TEACHERS BY REGIONS

Inservice Opportunities	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Curriculum Development and Revision Meetings	128	92.1	428	90.3	471	89.0	361	84.2	214	84.6	86	86.0	172	86.9	323	91.2	2183	88.1
Local Workshops for Science Teaching Methods	95	68.3	350	73.7	375	71.0	334	77.9	192	75.9	74	74.0	149	75.6	273	77.1	1842	74.4
College or University Courses	85	61.2	282	59.4	286	54.1	255	59.4	138	54.5	63	63.0	112	57.1	252	71.4	1473	59.5
Television and/or Radio Programs	42	30.2	177	37.3	123	23.3	194	45.2	72	28.5	22	22.0	62	31.6	136	38.4	828	33.5

Section III

Introduction

The secondary school science teachers in the sample are discussed in this section. The first part presents personal characteristics of the teacher population as to age, sex, highest degrees held, degree work in progress, academic and professional preparation both undergraduate and graduate, participation in National Science Foundation Institutes, employment status, and teaching experience.

This is followed by a part concerned with teaching assignments in science, the courses taught, grade levels, number of sections, size of classes, special facilities and their use and audio-visual equipment and their use.

The third part presents the characteristics of the randomly selected, individual class. Included are the title of the course, grade level of students, class size, type of classroom, curriculum materials, major textbook used with publication date, methods of instruction used, and methods of grading student performance.

The fourth part includes the teachers' evaluation of factors they believe are necessary for maintaining a high quality program in secondary school science. Teachers were finally asked to rate their level of satisfaction with teaching science as a career.

Questionnaires from 2,439 teachers were selected for analysis. These instruments were selected after inspection of data for completeness and accuracy of responses. Combined data from those not selected did not differ significantly (.05 level) from those selected on the items they completed.

Personal Characteristics of the Teachers

Age of Teachers

The means of the ages of the teachers in the eight regions ranged from 35.46 years in Plains to 39.38 years in Farwest (Table 168). The youngest science teachers were twenty years old, while one teacher was seventy-one years old.

Ages of the teachers were grouped in ten year intervals for analysis. There were fewer young science teachers in the Farwest Region than in any other region. There were more young teachers in the Southeast than in any other region. Nationally 61.5 percent of the teachers were under forty years of age. Ages of the science teachers generally followed a common pattern in all regions.

Sex of the Science Teachers Selected for Detailed Study

Table 169 indicates that 20.9 percent of the teachers were female while 79.1 percent were male. Four regions show a similar ratio of female to male science teachers. In the Southeast there were 44.2 percent female and 55.8 percent male science teachers, over twice as many females as the national average.

The teachers selected for detailed study varied by sex on a percentage basis very close to the ratios reported by principals. Only in the Great Lakes region, and in the Plains region were there deviations that should be noted. In these regions more males were selected than principals ratio would indicate should have been on a random basis.

TABLE 168

FREQUENCY DISTRIBUTION OF THE AGES OF TEACHERS IN THE SAMPLE

OF PUBLIC SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 143		N = 514		N = 460		N = 404		N = 248		N = 101		N = 201		N = 368		N = 2439	
Age	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
20-29	45	31.5	168	32.7	126	27.4	151	37.4	86	34.7	24	23.8	57	28.3	58	15.8	715	29.3
30-39	46	32.1	156	30.4	169	36.7	101	25.0	84	33.9	36	35.6	57	28.3	137	37.2	786	32.2
40-49	25	17.5	105	20.4	99	21.5	87	21.5	50	20.1	26	25.7	51	25.4	115	31.2	558	22.9
50-59	23	16.1	70	13.6	47	10.2	53	13.1	23	9.3	11	10.9	25	12.4	46	12.5	298	12.2
60-69	4	2.8	15	2.9	19	3.7	12	3.0	5	2.0	4	4.0	11	5.5	12	3.3	82	3.4
Totals	143	100.0	514	100.0	460	99.9	404	100.0	248	100.0	101	100.0	201	99.9	368	100.0	2439	100.0
$\bar{x}$	37.35		37.18		37.24		36.86		35.46		37.99		38.43		39.38			
SD	10.89		10.87		10.48		11.80		10.88		9.94		11.08		9.60			

TABLE 169

FREQUENCY DISTRIBUTION OF THE TEACHERS BY SEX

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 143		N = 518		N = 467		N = 414		N = 249		N = 101		N = 201		N = 371		N = 2464	
Sex	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Female	30	21.0	94	18.1	55	11.8	183	44.2	28	11.3	25	24.8	48	23.9	51	13.7	514	20.9
Male	113	79.0	424	81.9	412	88.2	231	55.8	221	88.7	76	75.2	153	76.1	320	86.3	1950	79.1
Totals	143	100.0	518	100.0	467	100.0	414	100.0	249	100.0	101	100.0	201	100.0	371	100.0	2464	100.0

Highest Degree Held by Science Teachers

Of the teachers responding, 0.3 percent had no degrees (Table 170). Bachelors degrees were the highest degrees held by 43.7 percent of the science teachers. Masters degrees were held by 53.0 percent of the teachers and 1.3 percent held a doctorate. Specialists and other types of degrees were held by 1.7 percent of the sampled teachers. In the Great Lakes Region 64.5 percent of the teachers had an M.A. or M.S. degree and in the Farwest 60.5 percent had M.A. or M.S. degrees. In the Southeast only 36.3 percent had the Masters degree.

TABLE 170

FREQUENCY DISTRIBUTION OF THE HIGHEST DEGREE HELD BY TEACHERS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 518		N = 465		N = 413		N = 249		N = 101		N = 202		N = 372		N = 2464	
Highest Degree	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No degree					1	0.2	2	0.5	1	0.4			3	1.5			7	0.3
BS or BA	52	36.1	212	40.9	157	33.8	248	60.0	120	48.2	52	51.5	95	47.0	140	37.6	1076	43.7
MS or MA	82	56.9	279	53.9	300	64.5	150	36.3	121	48.6	47	46.5	103	51.0	225	60.5	1307	53.0
Special	1	0.7	5	1.0	2	0.4	4	1.0	1	0.4					4	1.1	17	0.7
EdD or PhD	5	3.5	11	2.1	5	1.1	3	0.7	4	1.6	1	1.0	1	0.5	3	0.8	33	1.3
Other	4	2.8	11	2.1			6	1.5	2	0.8	1	1.0					24	1.0
Totals	144	100.0	518	100.0	465	100.0	413	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2464	100.0

Teachers Working Toward Higher Degrees

Of the science teachers in the sample, 24.6 percent were working toward a higher degree (Table 171). Of the teachers in the Mideast region, 30.5 percent reported working on advanced degrees while in the Farwest only 12.1 percent were working toward a higher degree. All other regions were close to the national average.

Of the teachers working on advanced degrees, 81.2 percent were working toward the Masters degree while 12.9 percent were working toward the Doctorate. (Table 172, p. 89)

TABLE 171

FREQUENCY DISTRIBUTION OF TEACHERS WORKING TOWARD DEGREES

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 514		N = 456		N = 406		N = 245		N = 101		N = 200		N = 371		N = 2437	
Working Toward Degree	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	104	72.2	357	69.5	354	77.6	289	71.2	181	73.9	78	77.2	148	74.0	326	87.9	1837	75.4
Yes	40	27.8	157	30.5	102	22.4	117	28.8	64	26.1	23	22.8	52	26.0	45	12.1	600	24.6
Totals	144	100.0	514	100.0	456	100.0	406	100.0	245	100.0	101	100.0	200	100.0	371	100.0	2437	100.0

TABLE 172

FREQUENCY DISTRIBUTION OF DEGREES ON WHICH TEACHERS ARE WORKING

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 40		N = 157		N = 102		N = 110		N = 66		N = 22		N = 53		N = 45		N = 595	
Degrees	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Bachelors			4	2.5	3	2.9			1	1.5	1	4.5	1	1.9			10	1.7
Masters	32	80.0	121	77.1	84	82.4	90	81.8	55	83.3	17	77.3	44	83.0	40	88.9	483	81.2
Specialist			1	0.6	3	2.9			2	3.0					1	2.2	7	1.2
Doctorate	4	10.0	28	17.8	12	11.8	13	11.8	6	9.1	4	18.2	8	15.1	2	4.4	77	12.9
Others	4	10.0	3	1.9			7	6.4	2	3.0					2	4.4	18	3.0
Totals	40	100.0	157	99.9	102	100.0	110	100.0	66	99.9	22	100.0	53	100.0	45	99.9	595	100.0

Academic and Professional Backgrounds of the Science Teachers

How much course work science teachers have completed in the academic areas of science and mathematics has been of interest to many groups. The present study has made an attempt to obtain this type of data. Coursework completed in each of the major areas of science and mathematics are presented for the sample of science teachers. In addition certain professional courses and experiences are included. Undergraduate and graduate levels are discussed separately. All hours of work are given in semester hours of credit. Means and standard deviations are given by regions.

Undergraduate Biological Science

Of the total sample of science teachers, 9.8 percent had no undergraduate credit in biological science. This was reasonably consistent across the regions as shown in Table 173, p. 90. For the convenience of the reader, semester hours are categorized into groups of ten hours except for the lowest and highest brackets. Percentages of hours gradually increase up to 40 semester hours with 22.8 percent having from 30 to 39 hours of undergraduate biology. No extreme variations occur in any of the regions compared to the national average.

The means of undergraduate biological science for the sample teachers ranged from 21.37 semester hours in New England to 29.01 semester hours in the Rocky Mountains.

TABLE 173

FREQUENCY DISTRIBUTION OF UNDERGRADUATE SEMESTER HOURS OF BIOLOGICAL SCIENCE TAKEN BY TEACHERS IN EACH REGION

	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 414		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2471	
Semester Hours	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	20	13.9	42	8.1	55	11.8	30	7.2	26	10.4	4	4.0	17	8.4	49	13.2	243	9.8
1-9	35	24.3	103	19.8	67	14.3	62	15.0	47	18.9	10	9.9	25	12.4	40	10.7	389	15.7
10-19	22	15.3	94	18.0	64	13.7	78	18.8	41	16.5	20	19.8	24	11.9	47	12.6	390	15.8
20-29	16	11.1	81	15.5	75	16.0	93	22.5	43	17.3	16	15.8	50	24.8	58	15.6	432	17.5
30-39	23	16.0	133	25.5	115	24.6	90	21.7	55	22.1	20	19.8	55	27.2	72	19.3	563	22.8
40-49	17	11.8	39	7.5	46	9.8	36	8.7	23	9.2	18	17.8	17	8.4	59	15.9	255	10.3
50-59	4	2.8	13	2.5	23	4.9	17	4.1	6	2.4	6	5.9	9	4.4	19	5.1	97	3.9
60-69	6	4.1	12	2.1	16	3.4	4	1.0	4	1.6	4	4.0	4	2.0	16	4.3	66	2.7
70-79	1	0.7			4	0.9	3	0.7	2	0.8			1	0.5	4	1.1	15	0.6
80-89			3	0.6	1	0.2			1	0.4	2	2.0			4	1.1	11	0.4
90-up			1	0.2	2	0.4	1	0.2	1	0.4	1	1.0			4	1.1	10	0.4
Totals	144	100.0	521	99.8	468	100.0	414	99.9	249	100.0	101	100.0	202	100.0	372	100.0	2471	99.9
$\bar{x}$	21.37		22.61		24.43		23.80		22.55		29.01		25.41		27.70			
SD	18.03		16.31		18.29		15.68		17.31		18.65		15.54		20.80			

Undergraduate Physical Science

Chemistry, physics and general physical science are included in this category. Nine percent of all the science teachers had no credit in the physical sciences. The largest group had taken from 10 to 19 semester hours with 24.6 percent included in this category. However, 21.0 percent had taken from 20 to 29 hours, and 14.7 percent had from 30 to 39 hours. No extreme differences were found among the eight regions in any of the semester hour levels.

Means varied from 18.76 semester hours in the Southeast to 26.81 semester hours in the New England Region.

TABLE 174

FREQUENCY DISTRIBUTION OF UNDERGRADUATE SEMESTER HOURS OF PHYSICAL SCIENCE TAKEN BY TEACHERS IN EACH REGION

	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 414		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2471	
Semester Hours	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	8	5.5	37	7.1	53	11.3	45	10.9	22	8.8	7	6.9	24	11.9	27	7.2	223	9.0
1-9	19	3.2	88	16.9	66	14.1	81	19.6	33	13.3	19	18.8	33	16.3	49	13.2	388	15.7
10-10	34	23.6	123	23.6	104	22.2	114	27.5	62	24.9	33	32.6	40	19.8	99	26.6	609	24.6
20-29	27	18.8	115	22.1	94	20.1	79	19.1	62	24.9	13	12.9	47	23.3	81	21.8	518	21.0
30-39	29	20.1	79	15.2	64	13.7	61	14.7	36	14.5	14	13.9	25	12.4	55	14.8	363	14.7
40-49	11	7.6	38	7.3	62	13.2	21	5.1	20	8.0	6	5.9	17	8.4	27	7.2	202	8.2
50-59	6	4.2	18	3.5	9	1.9	10	2.4	9	3.6	4	4.0	9	4.4	13	3.5	78	3.2
60-69	2	1.4	7	1.3	12	2.6	3	0.7	4	1.6	3	3.0	4	2.0	7	1.9	42	1.7
70-79	3	2.1	3	0.6	2	0.4							1	0.5	8	2.2	17	0.7
80-89	3	2.1	6	1.1					1	0.4			1	0.5	5	1.3	16	0.6
90-up	2	1.4	7	1.3	2	0.5					2	2.0	1	0.5	1	0.3	15	0.6
Totals	144	100.0	521	100.0	468	100.0	414	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2471	100.0
$\bar{x}$	26.81		23.30		22.13		18.76		22.20		21.47		22.30		23.72			
SD	19.91		18.18		16.94		14.26		16.03		19.61		17.72		18.14			

Geology, Astronomy, Space, and Earth Science courses are included in this category. A total of 53.1 percent of the science teachers had no credits in the area. Those teachers with from 1 to 9 semester hours of earth science made up 35.2 percent of the total. Some variation among the regions can be seen on Table 175, p.91. Only in the Rocky Mountains with 49.5 percent and in the Mideast with 41.6 percent were the 1 to 9 semester hours much higher than the national average. This is reflected in the means of those regions.

Means among the regions varied from a low of 3.1 semester hours in the Southeast to a high of 5.1 semester hours in the Rocky Mountains. The Mideast, with a much larger number of teachers followed with a mean of 5.0 semester hours.

TABLE 175

FREQUENCY DISTRIBUTION OF UNDERGRADUATE SEMESTER HOURS

OF EARTH SCIENCE TAKEN BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
Semester Hours	N = 144		N = 521		N = 468		N = 414		N = 249		N = 101		N = 202		N = 372		N = 2471	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	85	59.0	234	44.9	283	60.5	247	59.7	123	49.4	33	32.6	129	63.9	179	48.1	1313	53.1
1-9	47	32.6	217	41.6	129	27.6	128	30.9	104	41.8	50	49.5	56	27.7	140	37.6	871	35.2
10-19	7	4.9	41	7.9	35	7.5	25	6.0	16	6.4	13	12.9	10	4.9	37	9.9	184	7.4
20-29			14	2.7	12	2.6	6	1.5	4	1.6	4	4.0	4	2.0	5	1.3	49	2.0
30-39	3	2.1	5	1.0	3	0.6	5	1.2			1	1.0	1	0.5	4	1.1	22	0.9
40-49	2	1.4	7	1.3	3	0.6	3	0.7					2	1.0	5	1.3	22	0.9
50-up			3	0.6	3	0.6			2	0.8					2	0.6	10	0.4
Totals	144	100.0	521	100.0	468	100.0	414	100.0	249	100.0	101	100.0	202	100.0	372	99.9	2471	99.9
$\bar{x}$	3.69		5.03		3.76		3.12		3.68		5.11		3.03		4.68			
SD	7.07		8.42		8.55		6.25		6.92		5.95		6.34		8.19			

Undergraduate Mathematics

Table 176 indicates 14.4 percent of the sample teachers had no undergraduate mathematics credit. From 1 to 9 semester hours of credit had been obtained by 38.7 percent of the teachers. There were 28.1 percent who had from 10 to 19 hours of mathematics and 12.7 percent with 20 to 29 hours. No extreme variations in credit among the regions were identified.

Means ranged from a low of 9.3 semester hours in the Southeast to 12.3 semester hours of mathematics in New England.

TABLE 176

FREQUENCY DISTRIBUTION OF UNDERGRADUATE SEMESTER HOURS OF MATHEMATICS TAKEN BY TEACHERS BY REGIONS

Semester Hours	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 414		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2471	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	15	10.4	44	8.4	93	19.9	72	17.4	31	12.5	14	13.9	26	12.9	61	16.4	356	14.4
1-9	58	40.3	221	42.4	154	32.9	186	44.9	85	34.1	35	34.6	92	45.5	125	33.6	956	38 7
10-19	43	29.9	180	34.5	111	23.7	100	24.2	70	28.1	39	38.6	48	23.8	105	28.2	696	28.1
20-29	17	11.8	50	9.6	75	16.0	44	10.6	44	17.7	9	8.9	21	10.4	53	14.2	313	12.7
30-39	9	6.2	21	4.0	27	5.8	10	2.4	14	5.6	2	2.0	10	4.9	20	5.4	113	4.6
40-49	1	0.7	3	0.6	7	1.5	2	0.5	4	1.6	1	1.0	2	1.0	7	1.9	27	1.1
50-up	1	0.7	2	0.4	1	0.2			1	0.4	1	1.0	3	1.5	1	0.3	10	0.4
Totals	144	100.0	521	99.9	468	100.0	414	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2471	100.0
$\bar{x}$	12.27		11.37		11.93		9.27		12.67		10.58		11.58		11.27			
SD	9.74		8.66		11.45		8.12		10.51		10.30		11.87		10.23			

Undergraduate Science Teaching Methods

This category included courses in science teaching methods, but not general courses in professional education, nor student teaching and similar full-time field experiences. No credit in science methods courses was reported by 32.5 percent of the sample. Of all the science teachers, 38.4 percent had from 1 to 4 hours of science teaching methods credit, 20.0 percent had 5 to 9 hours, and 5.0 percent had 10 to 14 semester hours. Only in the Southwest region was there evidence of less credit hours of science teaching methods than the national average. This is reflected in the mean credit hours. The means ranged from a low of 3.04 hours in the Southwest to a high of 4.54 hours in the Mideast.

TABLE 177

FREQUENCY DISTRIBUTION OF UNDERGRADUATE SEMESTER HOURS OF SCIENCE TEACHING METHODS TAKEN BY TEACHERS IN EACH REGION

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 414		N = 249		N = 101		N = 202		N = 372		N = 2471	
Semester Hours	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	52	36.1	156	29.9	122	26.1	153	37.0	65	26.1	26	25.7	88	43.6	142	38.2	804	32.5
1-4	47	32.6	189	36.3	203	43.4	159	38.4	123	49.4	41	40.6	65	32.2	123	33.1	950	38.4
5-9	27	18.8	125	24.0	100	21.4	74	17.9	45	18.1	24	23.8	34	16.8	65	17.5	494	20.0
10-14	10	6.9	27	5.2	25	5.3	16	3.9	6	2.4	5	4.9	10	4.9	25	6.7	124	5.0
15-19	7	4.9	11	2.1	6	1.3	8	1.9	6	2.4	1	1.0	2	1.0	11	2.9	52	2.1
20-29			7	1.3	11	2.3	1	0.2	4	1.6	3	3.0	2	1.0	4	1.1	32	1.3
30-up	1	0.7	6	1.2	1	0.2	3	0.7			1	1.0	1	0.5	2	0.5	15	0.6
Totals	144	100.0	521	100.0	468	100.0	414	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2471	99.9
$\bar{x}$	4.08		4.54		4.31		3.64		3.93		4.32		3.04		3.76			
SD	5.21		6.32		6.62		6.11		7.09		5.52		4.31		5.12			

Student Teaching in Science

Student teaching experience has long been considered an essential part of the undergraduate professional education of secondary school teachers. As shown in Table 178, 34.2 percent of the teachers in the sample reported that they had no semester hours of student teaching in science. Some of these teachers did have student teaching in some field other than science or at the elementary school level, but their beginning preparation did not include student teaching in science.

From five to nine semester hours of science teaching was reported by 40.3 percent of the sample. Undergraduate credit from ten to fourteen semester hours was reported by 12.3 percent. There were minor variations among the regions, some with more and some with fewer credit hours.

Means ranged from 3.57 semester hours in the Southwest to 5.43 in the Great Lakes Region. Means include the large number of teachers who reported no student teaching in science; hence, the means are lower than those reported in studies that include only those teachers with credit hours for student teaching.

TABLE 178

FREQUENCY DISTRIBUTION OF UNDERGRADUATE SEMESTER HOURS OF STUDENT TEACHING IN SCIENCE TAKEN BY TEACHERS IN EACH REGION

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 414		N = 249		N = 101		N = 202		N = 372		N = 2471	
Semester Hours	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	64	44.4	194	37.2	119	25.4	181	43.7	50	20.1	24	23.7	84	41.6	129	34.7	845	34.2
1-4	9	6.2	50	9.6	51	10.9	50	12.1	40	16.1	14	13.9	22	10.9	50	13.4	286	11.6
5-9	43	29.9	183	35.1	223	47.6	130	31.4	141	56.6	47	46.5	88	43.6	140	37.6	995	40.3
10-14	20	13.9	80	15.4	69	14.7	46	11.1	16	6.4	15	14.9	7	3.4	50	13.4	303	12.3
15-19	8	5.6	13	2.5	3	0.6	6	1.4	1	0.4	1	1.0	1	0.5	3	0.8	36	1.4
20-up			1	0.2	3	0.6	1	0.2	1	0.4							6	0.2
Totals	144	100.0	521	100.0	468	99.8	414	99.9	249	100.0	101	100.0	202	100.0	372	99.9	2471	100.0
$\bar{x}$	5.30		5.02		5.43		4.38		5.44		5.24		3.57		4.48			
SD	9.37		4.86		5.56		7.03		6.04		3.77		3.46		4.01			

Graduate Credit in Biological Science

As listed in Table 179, 45.1 percent of the sample had no graduate semester hours in biological science. From one to nine graduate hours were reported by 21.1 percent, while 12.9 percent had taken from ten to nineteen hours. A few teachers reported having over 70 hours of graduate credit in this field.

Means show considerable variation among the regions with a high of 14.92 semester hours in the Farwest to a low of 7.30 hours of graduate credit in the Southeast Region.

TABLE 179

FREQUENCY DISTRIBUTION OF GRADUATE SEMESTER HOURS OF BIOLOGICAL SCIENCE TAKEN BY TEACHERS IN EACH REGION

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 414		N = 249		N = 101		N = 202		N = 372		N = 2471	
Semester Hours	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	73	50.7	221	42.4	218	46.6	226	54.6	133	53.4	42	41.6	91	45.1	112	30.1	1116	45.1
1-9	22	15.3	141	27.1	87	18.6	76	18.4	42	16.9	22	21.8	45	22.3	86	23.1	521	21.1
10-19	20	13.9	69	13.2	54	11.5	48	11.6	24	9.6	16	15.8	31	15.3	57	15.3	319	12.9
20-29	15	10.4	43	8.2	42	9.0	36	8.7	21	8.4	11	10.9	20	9.9	41	11.0	229	9.3
30-39	7	4.8	29	5.6	36	7.7	22	5.3	17	6.8	5	4.9	9	4.4	36	9.7	161	6.5
40-49	5	3.5	7	1.3	19	4.0	2	0.5	6	2.4	3	3.0	2	1.0	20	5.4	64	2.6
50-59	1	0.7	4	0.8	7	1.5			3	1.2	1	1.0	1	0.5	7	1.9	24	1.0
60-69			4	0.8	5	1.1	1	0.2			1	1.0	2	1.0	7	1.9	20	0.8
70-up	1	0.7	3	0.6			3	0.6	3	1.2			1	0.5	6	1.6	17	0.7
Totals	144	100.0	521	100.0	468	100.0	414	99.9	249	99.9	101	100.0	202	100.0	372	100.0	2471	100.0
$\bar{x}$	9.20		8.98		10.88		7.30		9.16		9.53		9.05		14.92			
SD	14.21		13.35		15.74		12.36		14.95		13.09		13.46		17.98			

Graduate Credit in Physical Sciences

Table 180, p. 96, indicates 46.0 percent of the sample reported no graduate semester hours of physical science. Of those who had graduate work, most had from one to nine hours. A few teachers, 0.9 percent had sixty or more hours in the area. There was a wide range in the means among the regions. In the Southeast, the mean was 5.76 semester hours while in New England, the mean was 13.51 hours of graduate credit.

TABLE 180

FREQUENCY DISTRIBUTION OF GRADUATE SEMESTER HOURS OF PHYSICAL SCIENCE TAKEN BY TEACHERS IN EACH REGION

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 414		N = 249		N = 101		N = 202		N = 372		N = 2471	
Semester Hours	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	56	38.9	216	41.5	232	49.6	239	57.7	111	44.6	46	45.5	98	48.5	139	37.4	1137	46.0
1-9	32	22.2	130	24.9	91	19.4	80	19.3	54	21.7	16	15.8	45	22.3	78	21.0	526	21.3
10-19	14	9.7	77	14.8	55	11.8	52	12.6	38	15.3	19	18.8	28	13.9	67	18.0	350	14.2
20-29	12	8.3	43	8.2	30	6.4	28	6.8	18	7.2	10	9.9	10	4.9	40	10.7	191	7.7
30-39	17	11.8	30	5.8	31	6.6	6	1.4	17	6.8	8	7.9	15	7.4	31	8.3	155	6.3
40-49	8	5.6	12	2.3	11	2.4	4	1.0	6	2.4	2	2.0	3	1.5	12	3.2	58	2.3
50-59	3	2.1	9	1.7	8	1.7	5	1.2	3	1.2			1	0.5	3	0.8	32	1.3
60-up	2	1.4	4	0.8	10	2.1			2	0.8			2	1.0	2	0.6	22	0.9
Totals	144	100.0	521	100.0	468	100.0	414	100.0	249	100.0	101	99.9	202	100.0	372	100.0	2471	100.0
$\bar{x}$	13.51		9.50		9.72		5.76		9.19		8.36		8.33		11.09			
SD	18.02		13.43		15.88		9.97		13.34		10.99		12.89		13.51			

Graduate Credit in Earth Science

Table 181 indicates that 70.4 percent of the sample had no graduate credit in earth science. Of those who did have graduate credit, 20.6 percent had from one to nine hours. A very few teachers had fifty or more semester hours. Means ranged from 1.85 hours in the Southeast to 4.61 semester hours in the Mideast Region.

TABLE 181

FREQUENCY DISTRIBUTION OF GRADUATE SEMESTER HOURS OF EARTH SCIENCE TAKEN BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 414		N = 249		N = 101		N = 202		N = 372		N = 2471	
Semester Hours	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	109	75.7	307	58.9	360	76.9	321	77.5	178	71.5	64	63.4	150	74.3	250	67.2	1739	70.4
1-9	28	19.4	148	28.4	76	16.2	71	17.1	52	20.9	17	16.8	33	16.3	85	22.8	510	20.6
10-19	4	2.8	34	6.5	21	4.5	16	3.9	13	5.2	15	14.8	12	5.9	24	6.5	139	5.6
20-29	1	0.7	11	2.1	5	1.1	3	0.7	4	1.6	3	3.0	4	2.0	8	2.2	39	1.6
30-39	1	0.7	13	2.5	2	0.4	1	0.2	1	0.4	1	1.0	2	1.0	3	0.8	24	1.0
40-49	1	0.7	6	1.2	2	0.4	2	0.5					1	0.5	2	0.5	14	0.6
50-up			2	0.4	2	0.4			1	0.4	1	1.0					6	0.2
Totals	144	100.0	521	100.0	468	99.9	414	99.9	249	100.0	101	100.0	202	100.0	372	100.0	2471	100.0
$\bar{x}$	2.07		4.61		2.27		1.85		2.59		3.87		2.63		2.90			
SD	5.54		9.36		7.07		5.69		7.07		7.50		6.33		6.21			

Graduate Credit in Mathematics

Table 182 indicates that 73.8 percent of the sample had no graduate credit in mathematics. The range from one to nine hours was reported by 20.2 percent of the sample. Only 6.0 percent of the science teachers had ten or more semester hours of graduate credit in mathematics.

Means ranged from 1.18 hours in the Southeast to 2.36 hours in the Farwest Region.

TABLE 182

FREQUENCY DISTRIBUTION OF GRADUATE SEMESTER HOURS OF MATHEMATICS TAKEN BY TEACHERS BY REGIONS

Semester Hours	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 414		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2471	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	99	68.8	346	66.4	365	78.0	338	81.6	188	75.5	72	71.3	159	78.7	257	69.1	1824	73.8
1-9	35	24.3	145	27.8	71	15.2	63	15.2	45	18.1	20	19.8	36	17.8	85	22.8	500	20.2
10-19	10	6.9	23	4.4	21	4.5	9	2.2	10	4.0	7	6.9	5	2.5	21	5.6	106	4.3
20-29			6	1.2	7	1.5	1	0.2	5	2.0			2	1.0	8	2.2	29	1.2
30-39			1	0.2	3	0.6	1	0.2			2	2.0					7	0.3
40-up					1	0.2	2	0.4	1	0.4					1	0.3	5	0.2
Totals	144	100.0	521	100.0	468	100.0	414	99.8	249	100.0	101	100.0	202	100.0	372	100.0	2471	100.0
$\bar{x}$	2.04		2.28		2.02		1.18		2.05		2.14		1.51		2.36			
SD	3.67		4.48		6.02		4.04		5.13		4.92		3.80		4.98			

Graduate Credit in Science Education

Table 183, p. 98, indicates that 52.4 percent of the sample had no graduate credit in science education. However, 32.7 percent had taken from one to nine hours and 10.4 percent from ten to nineteen semester hours in this area of professional education. There were 4.5 percent who had twenty or more hours in this field. Means among the regions varied from 2.28 hours in the Southeast to 6.10 hours in the Farwest.

TABLE 183

FREQUENCY DISTRIBUTION OF GRADUATE SEMESTER HOURS OF SCIENCE EDUCATION TAKEN BY TEACHERS IN EACH REGION

Semester Hours	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 414		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2471	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	83	57.6	209	40.1	261	55.8	275	66.4	145	58.2	50	49.5	134	66.3	137	36.8	1294	52.4
1-9	42	29.2	218	41.8	148	31.6	92	22.2	74	29.7	35	34.6	51	25.2	148	39.7	808	32.7
10-19	12	8.3	61	11.7	36	7.7	35	8.5	23	9.2	13	12.9	16	7.9	61	16.4	257	10.4
20-29	5	3.5	20	3.8	14	3.0	7	1.7	6	2.4	2	2.0			16	4.3	70	2.8
30-39			8	1.5	6	1.3	4	1.0	1	0.4	1	1.0	1	0.5	7	1.9	28	1.1
40-up	2	1.4	5	1.0	3	0.6	1	0.2							3	0.9	14	0.6
Totals	144	100.0	521	99.9	468	100.0	414	100.0	249	99.9	101	100.0	202	99.9	372	100.0	2471	100.0
$\bar{x}$	4.10		5.44		3.83		2.94		3.18		4.05		2.28		6.10			
SD	7.23		8.31		7.43		6.26		5.31		8.54		4.56		8.25			

National Science Foundation Institutes

Academic Year Institutes ... The National Science Foundation has made it possible for many science and mathematics teachers to have a year of concentrated study in their teaching fields. Table 184 indicates that of the 2,471 science teachers sampled 90.8 percent had not participated in an Academic Year Institute sponsored by N.S.F. However, 7.8 percent of the teachers had attended one institute, and 1.4 percent had participated in from two to four such institutes. Means indicate variations among the regions with 0.08 institutes for the Southeast and 0.16 for the Mideast and Farwest Regions.

TABLE 184

FREQUENCY DISTRIBUTION OF NATIONAL SCIENCE FOUNDATION - ACADEMIC YEAR INSTITUTES ATTENDED BY TEACHERS BY REGIONS

Number of Institutes	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 414		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		U.S. Total N = 2471	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	135	93.8	469	90.0	427	91.2	386	93.2	226	90.8	89	88.1	190	94.1	321	86.3	2243	90.8
1	7	4.8	45	8.6	33	7.1	25	6.0	20	8.0	11	10.9	9	4.4	44	11.8	194	7.8
2	1	0.7	5	0.9	7	1.5	1	0.2	2	0.8	1	1.0	3	1.5	6	1.6	26	1.1
3			2	0.4			2	0.5	1	0.4					1	0.3	6	0.2
4	1	0.7			1	0.2											2	0.1
Totals	144	100.0	521	100.0	468	100.0	414	99.9	249	100.0	101	100.0	202	100.0	372	100.0	2471	100.0

Summer Institutes ... A large number of the sample teachers had participated in Summer Institutes sponsored by the National Science Foundation. Table 185 indicates about half of the total sample had attended such an institute. Summer institutes vary from unitary in a special or general field to sequential institutes lasting for three summers. As a result, the number of institutes in which an individual teacher may have participated could be from one to several.

TABLE 185

FREQUENCY DISTRIBUTION OF NATIONAL SCIENCE FOUNDATION - SUMMER INSTITUTES ATTENDED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 414		N = 249		N = 101		N = 202		N = 372		N = 2471	
Number of Institutes	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	63	43.7	272	52.2	233	49.8	245	59.2	113	45.4	48	47.5	97	48.0	140	37.6	1211	49.0
1	24	16.7	91	17.5	67	14.3	55	13.3	48	19.3	23	22.8	32	15.8	91	24.5	431	17.4
2	18	12.5	59	11.3	61	13.0	49	11.8	40	16.1	13	12.9	36	17.8	50	13.4	326	13.2
3	13	9.0	45	8.6	47	10.0	43	10.4	25	10.0	10	9.9	18	8.9	38	10.2	239	9.7
4	18	12.5	34	6.5	40	8.6	19	4.6	19	7.6	5	4.9	13	6.4	35	9.4	183	7.4
5	5	3.5	16	3.1	15	3.2	3	0.7	3	1.2	1	1.0	3	1.5	13	3.5	59	2.4
6	1	0.7	3	0.6	3	0.6			1	0.4	1	1.0	2	1.0	4	1.1	15	0.6
7	2	1.4	1	0.2	2	0.4							1	0.5	1	0.3	7	0.3
Totals	144	100.0	521	100.0	468	99.9	414	100.0	249	100.0	101	100.0	202	99.9	372	100.0	2471	100.0

Of the total sample of science teachers, 17.4 percent had attended one institute, 13.2 percent had attended two, 9.7 percent had attended three, 7.4 percent had attended four. A small number of teachers had participated in five to seven institutes. The means among the eight regions range from a high of 1.52 institutes in New England to a low of 0.88 institutes in the Southeast Region.

Inservice Institutes ... The National Science Foundation has sponsored several types of in-service institutes. A common type early in the program was one designed to help a teacher get ready for adopting or adapting a specific science course such as BSCS, PSSC or CHEMS. Regularly scheduled meetings were held during the major portion of the school year. Another more recent development is the Cooperative College School Science Program. Usually these institutes include a summer program as well as in-service meetings during the school year.

Table 186, p. 100, indicates 71.7 percent of the sample had not participated in a National Science Foundation sponsored in-service institute. Teachers attending one institute, 15.3 percent, made up the largest group. This was the case in all regions. Another 6.9 percent of the sample had participated in two such institutes. Three institutes had been takey by 3.3 percent of the science teachers, while those having four or more in-service institutes made up the remaining 2.8 percent.

TABLE 186

FREQUENCY DISTRIBUTION OF NATIONAL SCIENCE FOUNDATION - IN-SERVICE INSTITUTES ATTENDED BY TEACHERS BY REGIONS

Number of Institutes	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 414		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2471	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	102	70.8	353	67.8	358	76.5	311	75.1	173	69.5	63	62.4	159	78.7	254	68.3	1773	71.7
1	17	11.8	83	15.9	60	12.8	63	15.2	35	14.1	19	18.8	25	12.4	75	20.1	377	15.3
2	15	10.4	32	6.1	32	6.8	27	6.5	21	8.4	9	8.9	8	3.9	26	7.0	170	6.9
3	6	4.2	24	4.6	12	2.6	10	2.4	9	3.6	5	4.9	5	2.5	11	2.9	82	3.3
4	1	0.7	13	2.5	4	0.9	3	0.7	7	2.8	2	2.0	2	1.0	4	1.1	36	1.5
5	1	0.7	2	0.4					1	0.4	1	1.0	1	0.5	1	0.3	7	0.3
6-up	2	1.4	14	2.7	2	0.4			3	1.2	2	2.0	2	1.0	1	0.3	26	1.0
Totals	144	100.0	521	100.0	468	100.0	414	99.9	249	100.0	101	100.0	202	100.0	372	100.0	2471	100.0
$\bar{x}$	0.61		0.74		0.40		0.37		0.61		0.74		0.40		0.50			
SD	1.23		1.46		0.90		0.77		1.23		1.28		0.99		0.93			

Workshops or Institutes for Specific Projects

Teachers were asked if they had attended a workshop or institute designed to prepare them for teaching a science course improvement project they were teaching or had taught.

Of the 1,207 teachers responding 53.9 percent had attended such a workshop or institute as shown in Table 187. Only minor variations occurred among the regions. The highest percentage of participation was in the Rocky Mountains with 66.7 percent affirmative responses. The lowest attendance was 45.3 percent in the New England Region.

TABLE 187

FREQUENCY DISTRIBUTION OF TEACHER PARTICIPATION IN WORKSHOPS OR INSTITUTES FOR SPECIFIC PROJECTS

Attended Workshop or Institute	New England N = 95		Mideast N = 209		Great Lakes N = 239		Southeast N = 158		Plains N = 141		Rocky Mountains N = 54		Southwest N = 65		Farwest N = 246		Total U.S. N = 1207	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No	52	54.7	91	43.5	126	52.7	64	40.5	69	48.9	18	33.3	30	46.2	107	43.5	557	46.1
Yes	43	45.3	118	56.5	113	47.3	94	59.5	72	51.1	36	66.7	35	53.8	139	56.5	650	53.9
Totals	95	100.0	209	100.0	239	100.0	158	100.0	141	100.0	54	100.0	65	100.0	246	100.0	1207	100.0

Research Institutes ... Another type of National Science Foundation sponsored program is the Research Institute. A science teacher has the opportunity to work with a research scientist for one or more summers in this program. Table 188 indicates that 96.9 percent of the sample had not taken part in such an institute. Only 2.0 percent had participated for one summer. The remaining 1.1 percent had from two to four summers of this experience. Means among the regions reflect the low level of participation of the teachers, though those in the Farwest Region had the highest mean.

TABLE 188

FREQUENCY DISTRIBUTION OF NATIONAL SCIENCE FOUNDATION - RESEARCH INSTITUTES ATTENDED BY TEACHERS BY REGIONS

Number of Institutes	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 414		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		U.S.Total N = 2471	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	142	98.6	509	97.7	452	96.6	407	98.3	240	96.4	100	99.0	197	97.5	347	93.3	2394	96.9
1	2	1.4	7	1.3	10	2.1	5	1.2	5	2.0			3	1.5	17	4.5	49	2.0
2			3	0.6	4	0.9	1	0.2	3	1.2			1	0.5	7	1.9	19	0.7
3			1	0.2	2	0.4					1	1.0			1	0.3	5	0.2
4			1	0.2			1	0.2	1	0.4			1	0.5			4	0.2
Totals	144	100.0	521	100.0	468	100.0	414	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2471	100.0

Elementary School Teaching Experience

Few of the teachers in the sample had elementary school teaching experience. Among the 2,470 teachers responding 87.4 percent reported no experience at the elementary school level. Of the remaining group, 8.7 percent had from one to four years in elementary schools while 2.7 percent had from five to nine years of such experience. Means ranged from a high of 0.9 years in the Southeast to a low of 0.3 years in the Mideast Region.

TABLE 189

FREQUENCY DISTRIBUTION OF YEARS OF ELEMENTARY SCHOOL TEACHING EXPERIENCE OF TEACHERS BY REGIONS

	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 414		Plains N = 249		Rocky Mountains N = 100		Southwest N = 202		Farwest N = 372		Total U.S. N = 2470	
Years	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	128	88.9	478	91.7	411	87.8	331	80.0	230	92.4	83	83.0	170	84.1	329	88.4	2160	87.4
1-4	11	7.6	33	6.3	39	8.3	58	14.0	9	3.6	14	14.0	21	10.4	31	8.3	216	8.7
5-9	5	3.5	7	1.3	12	2.6	15	3.6	5	2.0	3	3.0	7	3.5	12	3.2	66	2.7
10-14					2	0.4	5	1.2	4	1.6			3	1.5			14	0.6
15-19			1	0.2	1	0.2	3	0.7	1	0.4			1	0.5			7	0.3
20-up			2	0.4	3	0.6	2	0.4									7	0.3
Totals	144	100.0	521	99.9	468	99.9	414	99.9	249	100.0	100	100.0	202	100.0	372	99.9	2470	100.0
Mean	0.40		0.32		0.63		0.87		0.46		0.46		0.69		0.37			
Std. Dev.	1.42		1.73		3.17		2.82		2.02		1.29		2.24		1.26			

Secondary School Teaching Experience

One to four years of secondary school teaching experience was reported by 23.0 percent of the sample. Teachers with five to nine years of secondary school teaching accounted for 27.7 percent of the sample, the largest category. Ten to 14 years of secondary teaching experience was reported by 22.6 percent of the sample. Teachers with 15 to 19 years of such experience made up 11.0 percent, while 7.9 percent of the teachers had from twenty to twenty-four years in secondary schools. The remaining 8.7 percent ranged from twenty-five years to a high of forty-four years of secondary school teaching for three teachers in the sample. Across the regions means ranged only slightly from 10.0 years in the Southeast to 12.5 years in the Farwest.

TABLE 190

FREQUENCY DISTRIBUTION OF YEARS OF SECONDARY SCHOOL TEACHING

EXPERIENCE OF TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 414		N = 249		N = 100		N = 202		N = 372		N = 2470	
Years	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1-4	36	25.0	118	22.6	102	21.8	126	30.4	57	22.9	23	23.0	50	24.8	57	15.3	569	23.0
5-9	40	27.7	147	28.2	126	26.9	114	27.5	77	30.9	30	30.0	73	36.1	78	21.0	685	27.7
10-14	36	25.0	113	21.7	109	23.3	74	17.9	56	22.5	22	22.0	34	16.8	114	30.6	558	22.6
15-19	12	8.3	56	10.7	49	10.5	47	11.4	25	10.0	9	9.0	17	8.4	56	15.1	271	11.0
20-24	8	5.6	45	8.6	38	8.1	27	6.5	20	8.0	8	8.0	13	6.4	37	9.9	196	7.9
25-29	7	4.9	12	2.3	12	2.6	10	2.4	6	2.4	3	3.0	8	4.0	17	4.6	75	3.0
30-34	5	3.5	15	2.9	11	2.3	10	2.4	5	2.0	4	4.0	5	2.5	10	2.7	65	2.6
35-39			10	1.9	17	3.6	5	1.2	3	1.2	1	1.0	1	0.5	2	0.5	39	1.6
40-up			5	1.0	4	0.9	1	0.2					1	0.5	1	0.3	12	0.5
Totals	144	100.0	521	99.9	468	100.0	414	99.9	249	99.9	100	100.0	202	100.0	372	100.0	2470	99.9
Mean	10.65		11.38		11.88		10.00		10.34		10.45		10.09		12.45			
Std. Dev.	8.17		8.62		9.48		8.14		7.71		8.25		8.03		7.70			

Total Years of Teaching Experience

Table 191 indicates that 23.2 percent of the sample had from one to four years of teaching experience. From five to nine years of teaching was reported by 26.2 percent of the sample. Experience of from ten to fourteen years was reported by 22.2 percent of the teachers, while 11.1 percent had from fifteen to nineteen years of teaching experience. Only 8.7 percent had twenty to twenty-four years and the remaining 8.6 percent ranged from twenty-five to forty-five total years of teaching experience. Means ranged from a high of 12.8 years in the Farwest to a low of 10.5 years in the Plains.

TABLE 191

FREQUENCY DISTRIBUTION OF TOTAL YEARS OF TEACHING

EXPERIENCE OF TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 414		N = 249		N = 100		N = 202		N = 372		N = 2470	
Years	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1-4	35	24.2	123	23.6	109	23.3	123	29.7	54	21.7	22	22.0	54	26.7	54	14.5	574	23.2
5-9	41	28.3	142	27.3	105	22.4	104	25.1	82	32.9	30	30.0	67	33.2	76	20.4	647	26.2
10-14	33	22.9	106	20.3	119	25.4	70	16.9	54	21.7	21	21.0	35	17.3	111	29.8	549	22.2
15-19	12	8.3	58	11.1	45	9.6	54	13.0	19	7.6	9	9.0	19	9.4	58	15.6	274	11.1
20-24	8	5.9	44	8.4	48	10.3	28	6.8	24	9.6	10	10.0	11	5.4	42	11.3	215	8.7
25-29	4	2.8	14	2.7	11	2.3	10	2.4	6	2.4	2	2.0	6	3.0	15	4.0	68	2.8
30-34	8	5.6	18	3.5	10	2.1	16	3.9	5	2.0	4	4.0	7	3.5	10	2.7	78	3.2
35-39	3	2.1	10	1.9	15	3.2	7	1.7	4	1.6	2	2.0	3	1.5	4	1.1	48	1.9
40-up			6	1.1	6	1.3	2	0.5	1	0.4					2	0.5	17	0 7
Totals	144	100.0	521	99.9	468	99.9	414	100.0	249	99.9	100	100.0	202	100.0	372	99.9	2470	100.0
Mean	11.15		11.47		12.05		10.73		10.55		10.85		10.20		12.76			
Std. Dev.	8.92		9.03		9.58		8.99		8.25		8.74		8.56		7.95			

Total Years of Science Teaching

Table 192 indicates that one to four total years of science teaching experience was reported by 25.4 percent of the sample. Total science teaching experience of from five to nine years was reported by 27.3 percent of the teachers. Teachers with from 10 to 14 years made up 22.9 percent, fifteen to nineteen years experience was reported by 11.0 percent, 20 to 24 years of total science teaching was reported by 7.0 percent. From 25 to over 40 years was reported by 6.4 percent of the sample. Means varied from a low of 9.0 years in the Southeast to a high of 12.0 years in the Farwest.

TABLE 192

FREQUENCY DISTRIBUTION OF TOTAL YEARS OF SCIENCE TEACHING

IN SECONDARY SCHOOLS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 414		N = 249		N = 100		N = 202		N = 372		N = 2470	
Years	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1-4	38	26.4	128	24.6	117	25.0	139	33.6	60	24.1	26	26.0	57	28.2	62	16.7	627	25.4
5-9	40	27.7	146	28.0	118	25.2	119	28.7	75	30.1	30	30.0	72	35.6	75	20.2	675	27.3
10-14	35	24.3	113	21.7	108	23.1	71	17.1	57	22.9	21	21.0	36	17.8	124	33.3	565	22.9
15-19	13	9.0	59	11.3	48	10.3	50	12.1	26	10.4	10	10.0	13	6.4	52	14.0	271	11.0
20-24	7	4.9	35	6.7	36	7.7	21	5.1	18	7.2	6	6.0	12	5.9	38	10.2	173	7.0
25-29	5	3.5	13	2.5	10	2.1	5	1.2	6	2.4	4	4.0	7	3.5	13	3.5	63	2.6
30-34	4	2.8	15	2.9	17	3.6	5	1.2	4	1.6	2	2.0	4	2.0	5	1.3	56	2.2
35-39	2	1.4	9	1.7	10	2.1	3	0.7	3	1.2	1	1.0	1	0.5	2	0.5	31	1.2
40-up			3	0.6	4	0.9	1	0.2							1	0.3	9	0.4
Totals	144	100.0	521	100.0	468	100.0	414	99.9	249	99.9	100	100.0	202	99.9	372	100.0	2470	100.0
Mean	10.42		10.96		11.51		8.97		10.08		9.89		9.27		11.91			
Std. Dev.	7.90		8.37		9.62		7.23		7.56		8.01		7.60		7.24			

Years in the Present School System

Table 193, p. 105, indicates that 33.8 percent of the sample reported from one to four years in the present school system. From five to nine years was reported by 28.8 percent of the sample and from 10 to 14 years was reported by 18.9 percent. Relatively few of the sample teachers had more than fifteen years in the present school system. Means among the regions ranged only slightly, from a low of 8.0 years in the Plains to a high of 9.1 years in the Farwest.

TABLE 193

FREQUENCY DISTRIBUTION OF YEARS OF TEACHING IN

PRESENT SCHOOL SYSTEM BY REGIONS

	New Englnad		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 143		N = 519		N = 468		N = 414		N = 249		N = 100		N = 202		N = 352		N = 2447	
Years	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1-4	54	37.7	163	31.3	145	31.0	175	42.3	103	41.4	33	33.0	66	32.7	95	25.5	834	33.8
5-9	43	30.1	152	29.1	133	28.4	105	25.4	69	27.7	30	30.0	77	38.1	103	27.7	712	28.8
10-14	22	15.4	97	19.0	108	23.1	64	15.5	38	15.3	20	20.0	30	14.8	85	22.8	466	18.9
15-19	12	8.4	48	9.2	34	7.3	39	9.4	25	10.0	8	8.0	12	5.9	54	14.5	232	9.4
20-24	4	2.8	28	5.4	24	5.1	16	3.9	5	2.0	5	5.0	7	3.5	2	5.9	11	4.5
25-29	4	2.8	12	2.3	10	2.1	6	1.4	4	1.6	4	4.0	5	2.5	8	2.2	53	2.1
30-34	4	2.8	11	2.1	7	1.5	5	1.2	2	0.8			3	1.5	5	1.3	37	1.5
35-39			5	1.0	6	1.3	3	0.7	3	1.2			1	0.5			18	0.7
40-up			3	0.6	1	0.2	1	0.2					1	0.5			6	0.2
Totals	143	100.0	519	100.0	468	100.0	414	100.0	249	100.0	100	100.0	202	100.0	352	99.9	2447	99.9
Mean	8.43		9.60		9.28		8.05		8.03		8.49		8.27		9.90			
Std. Dev.	7.47		8.04		7.62		7.28		8.04		6.82		7.69		6.73			

Teaching Assignments of Sample Teachers

Grade Level of Courses

Teachers were asked to identify the grade level or levels of students in their courses. Table 194, p. 106, presents the responses of the teachers. Approximately 18 percent of the sample were seventh and eighth grade students; the other 82 percent were in grades 9-12. While the majority of the courses were offered to a single grade level, a large number of courses were offered for students in grades 10-11-12 (9.7 percent) and grades 11-12 (13.9 percent). These courses for students in several grades were primarily biology for 10-11-12 and physics and chemistry for grades 11-12.

TABLE 194

FREQUENCY DISTRIBUTION OF GRADE LEVEL(S) OF MAJOR COURSES

TAUGHT BY THE SAMPLE OF TEACHERS BY REGIONS

Grade Level(s)	New England N = 143		Mideast N = 516		Great Lakes N = 466		Southeast N = 410		Plains N = 246		Rocky Mountains N = 100		Southwest N = 200		Farwest N = 371		Total U.S. N = 2452	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7	2	1.4	60	11.6	22	4.7	53	12.9	26	10.6	13	13.0	11	5.5	17	4.6	204	8.3
8	5	3.5	48	9.3	24	5.2	47	11.5	30	12.2	20	20.0	12	6.0	32	8.6	218	8.9
9	19	13.3	99	19.2	94	20.2	85	20.7	49	19.9	17	17.0	39	19.5	32	8.6	434	17.7
10	39	27.2	107	20.7	109	23.4	85	20.7	46	18.7	12	12.0	62	31.0	59	15.9	519	21.2
11	12	8.4	55	10.7	31	6.7	15	3.7	6	2.4	2	2.0	5	2.5	10	2.7	136	5.5
12	22	15.4	43	8.3	37	7.9	20	4.9	23	9.3	2	2.0	10	5.0	22	5.9	179	7.3
7-8			1	0.2	1	0.2	4	1.0	2	0.8			1	0.5	1	0.3	10	0.4
8-9	1	0.7	4	0.8			2	0.5	1	0.4	2	2.0	2	1.0	2	0.5	14	0.6
9-10	3	2.1	4	0.8	16	3.4	5	1.2	2	0.8			7	3.5	11	3.0	48	2.0
10-11	3	2.1	10	1.9	9	1.9	8	2.0	1	0.4			6	3.0	6	1.6	43	1.7
11-12	28	19.6	58	11.2	56	12.0	47	11.5	30	12.2	14	14.0	26	13.0	82	22.1	341	13.9
7-8-9	1	0.7	4	0.8	2	0.4	4	1.0			1	1.0	1	0.5	1	0.3	14	0.6
9-10-11					4	0.9	1	0.2	3	1.2					2	0.5	10	0.4
10-11-12	6	4.2	20	3.9	52	11.2	26	6.3	20	8.1	15	15.0	16	8.0	84	22.6	239	9.7
9-10-11-12	2	1.4	2	0.4	9	1.9	7	1.7	6	2.4	1	1.0	2	1.0	10	2.7	39	1.6
Other			1	0.2			1	0.2	1	0.4							3	0.1
Ungraded											1	1.0					1	0.1
Totals	143	100.0	516	100.0	466	100.0	410	100.0	246	99.8	100	100.0	200	100.0	371	99.9	2452	100.0

Number of Sections of Courses Taught by the Teachers

Teachers were asked to state the number of sections of each of the courses he was teaching. Table 195, p. 107, indicates the number of sections reported. Of the total reported, 17.0 percent of the teachers reported that they taught only one section. Two sections were reported by 25.4 percent of the teachers. Those reporting three sections of a given course made up 21.6 percent of the total sample. Four sections were reported by 17.8 percent and five sections by 15.5 percent of the teachers. Few teachers taught more than five sections of a specific course, but there were a few with six, seven and eight sections.

Means among the regions showed some variation. In the Southwest a high of 3.23 sections was reported and in New England there was a low of 2.35 sections.

TABLE 195

FREQUENCY DISTRIBUTION OF NUMBER OF SECTIONS OF

COURSES TAUGHT BY REGIONS

Number of Sections	New England N = 143		Mideast N = 517		Great Lakes N = 465		Southeast N = 409		Plains N = 244		Rocky Mountains N = 100		Southwest N = 200		Farwest N = 368		Total U.S. N = 2446	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	34	23.8	88	17.0	74	15.9	74	18.1	42	17.2	20	20.0	34	17.0	51	13.8	417	17.0
2	55	38.4	133	25.7	130	28.0	102	24.9	57	23.4	23	23.0	35	17.5	87	23.6	622	25.4
3	31	21.7	112	21.7	118	25.4	80	19.6	45	18.4	11	11.0	36	18.0	95	25.8	528	21.6
4	17	11.9	93	18.0	80	17.2	67	16.4	43	17.6	21	21.0	44	22.0	71	19.3	436	17.8
5	6	4.2	79	15.3	56	12.0	76	18.6	50	20.5	15	15.0	47	23.5	51	13.8	380	15.5
6			11	2.1	7	1.5	10	2.4	6	2.5	8	8.0	4	2.0	12	3.3	58	2.4
7			1	0.2							1	1.0			1	0.3	3	0.1
8									1	0.4	1	1.0					2	0.1
Totals	143	100.0	517	100.0	465	100.0	409	100.0	244	100.0	100	100.0	200	100.0	368	99.9	2446	99.9
$\bar{x}$	2.35		2.95		2.86		2.99		3.10		3.19		3.23		3.06			
SD	1.09		1.40		1.30		1.45		1.50		1.72		1.47		1.37			

Average Size of the Classes

Sizes of the classes reported by the teachers are shown in Table 196. Thirty-four percent of the classes had from 25 to 29 students. About twenty-six percent of the classes had from 20 to 24 students per class. About 22 percent of the classes had from 30 to 34 students. Both larger and smaller class sizes were reported, but the percentage was much lower.

Class size means varied little among the regions. The highest mean of 26.80 students per class occurred in the Farwest while the lowest, 22.21 students per class was found in the New England region.

TABLE 196

FREQUENCY DISTRIBUTION OF AVERAGE CLASS SIZE OF COURSES

TAUGHT BY REGIONS

Number of Students	New England N = 142		Mideast N = 517		Great Lakes N = 465		Southeast N = 409		Plains N = 245		Rocky Mountains N = 101		Southwest N = 200		Farwest N = 371		Total U.S. N = 2450	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1-9	2	1.4			4	0.9	4	1.0	8	3.3	2	2.0	2	1.0			22	0.9
10-14	8	5.6	16	3.1	12	2.6	16	3.9	17	6.9	6	5.9	3	1.5	11	3.0	89	3.6
15-19	28	19.7	41	7.9	42	9.0	31	7.6	26	10.5	11	10.9	18	9.0	20	5.4	217	8.8
20-24	55	38.7	130	25.1	148	31.8	88	21.5	69	28.2	22	21.8	48	24.0	81	21.8	641	26.2
25-29	40	28.2	161	31.1	170	36.6	139	34.0	84	34.4	26	25.7	74	37.0	139	37.5	833	34.0
30-34	8	5.6	143	27.7	78	16.8	105	25.7	33	13.5	26	25.7	46	23.0	97	26.1	536	21.9
35-39			23	4.4	8	1.7	19	4.6	5	2.0	6	5.9	9	4.5	18	4.8	83	3.6
40-44			3	0.6	1	0.2	3	0.7			2	2.0			3	0.8	12	0.5
45-up	1	0.7			2	0.4	4	1.0	3	1.2					2	0.6	12	0.5
Totals	142	99.9	517	99.9	465	100.0	409	100.0	245	100.0	101	99.9	200	100.0	371	100.0	2450	100.0
$\bar{x}$	22.21		26.06		24.89		26.07		23.64		24.79		25.76		26.80			
SD	5.95		6.88		6.12		6.72		6.74		7.31		5.47		6.19			

Special Facilities for Science Courses

Teachers were asked to check the special science facilities that were available for their science teaching and to rank the use they made of these facilities in their classes. The list of facilities are presented in the order of availability as reported by the sample of teachers. In presenting the use of the various facilities the base number used was the number of schools having the facility available.

Science Darkrooms

Science darkrooms were available in 43.2 percent of the 2,090 schools reporting (Table 197). Considerable variations occur among the regions with a high of 56.7 percent in New England to a low 28.9 percent in the Rocky Mountains. How much use the teachers made of darkrooms is shown in the lower section of the table. Of the 903 available darkrooms, 19.3 percent of the teachers used them frequently, 22.1 percent occasionally, 51.2 percent rarely, and 7.4 percent did not use them for their classes. Percentages of use were consistent in all regions.

TABLE 197

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF SCIENCE DARKROOM BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 127		N = 452		N = 403		N = 334		N = 207		N = 90		N = 154		N = 323		N = 2090	
No	55	43.3	252	55.8	196	48.6	214	64.1	106	51.2	64	71.1	107	69.5	193	59.8	1187	56.8
Yes	72	56.7	200	44.2	207	51.4	120	35.9	101	48.8	26	28.9	47	30.5	130	40.2	903	43.2
Totals	127	100.0	452	100.0	403	100.0	334	100.0	207	100.0	90	100.0	154	100.0	323	100.0	2090	100.0
Use	N = 72		N = 200		N = 207		N = 120		N = 101		N = 26		N = 47		N = 130		N = 903	
Frequently	13	18.1	42	21.0	40	19.3	23	19.2	24	23.7	3	11.5	8	17.0	21	16.1	174	19.3
Occasionally	11	15.3	43	21.5	44	21.3	27	22.5	23	22.8	10	38.5	12	25.5	30	23.1	200	22.1
Rarely	42	58.3	103	51.5	102	49.3	60	50.0	51	50.5	12	46.2	24	51.1	68	52.3	462	51.2
Not Used	6	8.3	12	6.0	21	10.1	10	8.3	3	3.0	1	3.8	3	6.4	11	8.5	67	7.4
Totals	72	100.0	200	100.0	207	100.0	120	100.0	101	100.0	26	100.0	47	100.0	130	100.0	903	100.0

Closed Circuit Television

In the 2,037 schools responding only 29.9 percent reported that closed circuit television was available for science teaching. Among the regions, availability ranged from 19.3 percent in the Rocky Mountains to 35.5 percent in the Farwest. Of the 609 schools having closed circuit television 10.0 percent of the science teachers used it frequently, 19.9 percent occasionally, 66.2 percent rarely, and 3.9 percent did not use it for their science classes. Usage was ranked in the same order by all the regions although the percentage of use did vary among the regions.

TABLE 198

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE

OF CLOSED CIRCUIT TELEVISION BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 124		N = 441		N = 381		N = 322		N = 207		N = 88		N = 150		N = 324		N = 2037	
No	88	73.3	296	67.1	264	69.3	245	76.1	140	67.6	71	80.7	115	76.7	209	64.5	1428	70.1
Yes	36	26.7	145	32.9	117	30.7	77	23.9	67	32.4	17	19.3	35	23.3	115	35.5	609	29.9
Totals	124	100.0	441	100.0	381	100.0	322	100.0	207	100.0	88	100.0	150	100.0	324	100.0	2037	100.0
Use	N = 36		N = 145		N = 117		N = 77		N = 67		N = 17		N = 35		N = 115		N = 609	
Frequently	2	5.6	14	9.7	3	2.6	13	16.9	6	9.0	4	23.5	2	5.7	17	14.8	61	10.0
Occasionally	7	19.4	28	19.3	23	19.6	15	19.5	10	14.9	2	11.8	10	28.6	26	22.6	121	19.9
Rarely	26	72.2	96	66.2	80	68.4	47	61.0	50	74.6	11	64.7	22	62.8	71	61.7	403	66.2
Not Used	1	2.8	7	4.8	11	9.4	2	2.6	1	1.5			1	2.9	1	0.9	24	3.9
Totals	36	100.0	145	100.0	117	100.0	77	100.0	67	100.0	17	100.0	35	100.0	115	100.0	609	100.0

Nature Trails

Nature trails were available in 28.9 percent of the schools reporting. Among the regions the Farwest reported a low of 18.2 percent while New England had a high of 41.1 percent availability of nature trails for science teaching. Only 6.1 percent of the teachers used the trails frequently, 22.0 percent occasionally, 65.5 percent rarely and 6.4 percent did not use them in their science classes. Percentage of use was consistent in all regions. Comments on a number of the questionnaires indicated that the nature trails were either too far away from the school for easy use, or not organized on a basis to facilitate the use of the resource by groups as large or larger than a class.

TABLE 199

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S

USE OF NATURE TRAIL(S) BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 124		N = 428		N = 383		N = 325		N = 193		N = 87		N = 150		N = 303		N = 1993	
No	73	58.9	292	68.2	260	67.9	227	69.8	135	69.9	64	73.6	118	78.7	248	81.8	1417	71.1
Yes	51	41.1	136	31.8	123	32.1	98	30.2	58	30.1	23	26.4	32	21.3	55	18.2	576	28.9
Totals	124	100.0	428	100.0	383	100.0	325	100.0	193	100.0	87	100.0	150	100.0	303	100.0	1993	100.0
Use	N = 51		N = 136		N = 123		N = 98		N = 58		N = 23		N = 32		N = 55		N = 576	
Frequently	5	9.8	10	7.3	6	4.9	5	5.1	3	5.2			1	3.1	5	9.1	35	6.1
Occasionally	11	21.6	30	22.1	21	17.1	20	20.4	16	27.6	7	30.4	8	25.0	14	25.4	127	22.0
Rarely	27	52.9	87	64.0	91	74.0	69	70.4	36	62.0	15	65.2	21	65.6	31	56.4	377	65.5
Not Used	8	15.7	9	6.6	5	4.0	4	4.1	3	5.2	1	4.3	2	6.3	5	9.1	37	6.4
Totals	51	100.0	136	100.0	123	100.0	98	100.0	58	100.0	23	99.9	32	100.0	55	100.0	576	100.0

Greenhouses

Of the 2,030 schools reporting, 567 had a greenhouse available for science teaching. This was 27.9 percent of the schools. The lowest availability, 13.8 percent was in the Southwest Region and the highest was 44.7 percent in the Great Lakes Region. In those schools having greenhouses, 30.9 percent of the teachers used them frequently in their teaching, 19.9 percent occasionally, 40.4 percent rarely, and 8.8 percent did not use them. The percentage of use was consistent for all regions.

TABLE 200

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S

USE OF GREENHOUSE BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 125		N = 444		N = 394		N = 312		N = 194		N = 89		N = 148		N = 324		N = 2030	
No	76	60.8	330	74.3	218	55.3	269	86.2	156	80.4	69	77.5	117	79.1	228	70.4	1463	72.1
Yes	49	39.2	114	25.7	176	44.7	43	13.8	38	19.6	20	22.5	31	20.9	96	29.6	567	27.9
Totals	125	100.0	444	100.0	394	100.0	312	100.0	194	100.0	89	100.0	148	100.0	324	100.0	2030	100.0
Use	N = 49		N = 114		N = 176		N = 43		N = 38		N = 20		N = 31		N = 96		N = 567	
Frequently	15	30.6	31	27.2	61	34.7	7	16.3	14	36.8	10	50.0	6	19.4	31	32.3	175	30.9
Occasionally	9	18.4	23	20.2	35	19.9	14	32.6	7	18.4	3	15.0	7	22.6	15	15.6	113	19.9
Rarely	21	42.8	50	43.8	53	30.1	21	48.8	17	44.7	7	35.0	17	54.8	43	44.8	229	40.4
Not Used	4	8.2	10	8.8	27	15.3	1	2.3					1	3.2	7	7.3	50	8.8
Totals	49	100.0	114	100.0	176	100.0	43	100.0	38	99.9	20	100.0	31	100.0	96	100.0	567	100.0

Weather Stations

Only 18.8 percent of the 1,943 schools responding had weather stations available for science teaching. Availability among the regions varied only slightly above or below the national average (Table 201). In the 366 schools with weather stations 34.7 percent of the teachers reported using them frequently, 17.8 percent occasionally, 39.6 percent rarely, and 7.9 percent of the teachers did not use the weather station for their science classes. The percentages were in similar rank order among the regions.

TABLE 201

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF WEATHER STATION BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 117		N = 422		N = 370		N = 312		N = 185		N = 87		N = 147		N = 303		N = 1943	
No	88	75.2	321	76.1	297	80.3	269	86.2	153	82.7	74	85.1	125	85.0	250	82.5	1577	81.2
Yes	29	24.8	101	23.9	73	19.7	43	13.8	32	17.3	13	14.9	22	15.0	53	17.5	366	18.8
Totals	117	100.0	422	100.0	370	100.0	312	100.0	185	100.0	87	100.0	147	100.0	303	100.0	1943	100.0
Use	N = 29		N = 101		N = 73		N = 43		N = 32		N = 13		N = 22		N = 53		N = 366	
Frequently	10	34.5	40	39.6	27	37.0	12	27.9	11	34.4	5	38.5	8	36.4	14	26.4	127	34.7
Occasionally	1	3.4	23	22.8	11	15.1	6	14.0	6	18.7	3	23.1	1	4.5	14	26.4	65	17.8
Rarely	13	44.8	33	32.7	28	38.3	21	48.8	15	46.9	4	30.7	11	50.0	20	37.7	145	39.6
Not Used	5	17.2	5	4.9	7	9.6	4	9.3			1	7.7	2	9.1	5	9.4	29	7.9
Totals	29	99.9	101	100.0	73	100.0	43	100.0	32	100.0	13	100.0	22	100.0	53	99.9	366	100.0

Land Laboratory

Among the 1,953 schools, 16.8 percent reported a land laboratory (Table 202). The Southwest was low with 8.3 percent and New England was high with 25.4 percent having this facility. Available land laboratories were used frequently by 18.2 percent, occasionally by 29.8 percent, rarely by 46.2 percent, and 5.8 percent did not use this facility. Among the regions, the Great Lakes did not follow the national averages. Although there were 82 schools reporting availability of the facility, teachers did not use the land laboratory as much as did the teachers in the other regions. Comments regarding these facilities were similar to those related to nature trails. Facilities that were within reasonable distance and well developed for groups of class size or larger were generally used more frequently. Use of the land laboratory was more frequent in districts that had programs encouraging use of outdoor facilities.

TABLE 202

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF LAND LABORATORY BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 118		N = 417		N = 379		N = 310		N = 191		N = 87		N = 145		N = 306		N = 1953	
No	88	74.6	352	84.4	297	78.4	270	87.1	154	80.6	73	83.9	133	91.7	257	84.0	1624	83.2
Yes	30	25.4	65	15.6	82	21.6	40	12.9	37	19.4	14	16.1	12	8.3	49	16.0	329	16.8
Totals	118	100.0	417	100.0	379	100.0	310	100.0	191	100.0	87	100.0	145	100.0	306	100.0	1953	100.0
Use	N = 30		N = 65		N = 82		N = 40		N = 37		N = 14		N = 12		N = 49		N = 329	
Frequently	8	26.7	13	20.0	6	7.3	6	15.0	8	21.6	3	21.4	3	25.0	13	26.5	60	18.2
Occasionally	10	33.3	18	27.7	19	23.2	14	35.0	11	29.7	4	28.6	5	41.7	17	34.7	98	29.8
Rarely	9	30.0	33	50.8	47	57.3	19	47.5	17	45.9	7	50.0	3	25.0	17	34.7	152	46.2
Not Used	3	10.0	1	1.5	10	12.2	1	2.5	1	2.7			1	8.3	2	4.1	19	5.8
Totals	30	100.0	65	100.0	82	100.0	40	100.0	37	99.9	14	100.0	12	100.0	49	100.0	329	100.0

The Planetarium

A planetarium was available in 16.7 percent of the 1,970 schools reporting (Table 203). The Southwest was high with 22.5 percent and New England was low with 6.0 percent availability. Other regions were closer to the national percentage. It is obvious that usage of this type of facility is low since 79.9 percent of the teachers reported using it rarely. A check of a number of sample schools indicated two types of availability: (1) located within the school, and (2) located at a site removed from the school. Usage for the teacher was higher (though not by much) when the facility was located within school. Usage of the facility tended to be higher when it was a facility used by several schools. Locating such a facility at a large school to be shared by smaller schools would provide a facility readily accessible to a sizable student population, as well as being available for use by smaller schools.

TABLE 203

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF PLANETARIUM BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 117		N = 428		N = 373		N = 323		N = 187		N = 89		N = 151		N = 302		N = 1970	
No	110	94.0	344	80.4	306	82.0	259	80.2	151	80.7	76	85.4	117	77.5	278	92.1	1641	83.3
Yes	7	6.0	84	19.6	67	18.0	64	19.8	36	19.3	13	14.6	34	22.5	24	7.9	329	16.7
Totals	117	100.0	428	100.0	373	100.0	323	100.0	187	100.0	89	100.0	151	100.0	302	100.0	1970	100.0
Use	N = 7		N = 84		N = 67		N = 64		N = 36		N = 13		N = 34		N = 24		N = 329	
Frequently	3	42.8	9	10.7	9	13.4	1	1.5	2	5.6			1	2.9			25	7.6
Occasionally	1	14.3	6	7.1	6	9.0	6	9.4	3	8.3	2	15.4	4	11.8	1	4.1	29	8.8
Rarely	3	42.8	60	71.4	51	76.1	57	89.1	31	86.1	11	84.6	28	82.4	22	91.7	263	79.9
Not Used			9	10.7	1	1.5							1	2.9	1	4.1	12	3.6
Totals	7	99.9	84	99.9	67	100.0	64	100.0	36	100.0	13	100.0	34	100.0	24	99.9	329	99.9

Computer Terminals

The computer terminal in a school is a relatively recent additional resource for teaching science. Of the 1,942 schools checking this item 15.3 percent reported its availability (Table 204). About 34 percent of the New England schools reported such facilities were available, while in the Southeast only 5.8 percent of the schools had such facilities available. It will be noted that the Rocky Mountains and Farwest were below the national average. Although 58.6 percent of the teachers reported rarely using the terminal, 17.8 percent used it frequently and 18.9 percent used it occasionally. Percentage orders were nearly similar in all regions. Comments from teachers contacted indicated the major reasons for not using the computer terminals available were (1) too few terminals; (2) costs of computer time; and (3) personal lack of knowledge regarding computer use.

TABLE 204

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF COMPUTER TERMINAL(S) BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 124		N = 423		N = 368		N = 308		N = 187		N = 86		N = 148		N = 298		N = 1942	
No	82	66.1	355	83.9	307	83.4	290	94.2	144	77.0	77	89.5	125	84.5	265	88.9	1645	84.7
Yes	42	33.9	68	16.1	61	16.6	18	5.8	43	23.0	9	10.5	23	15.5	33	11.1	297	15.3
Totals	124	100.0	423	100.0	368	100.0	308	100.0	187	100.0	86	100.0	148	100.0	298	100.0	1942	100.0
Use	N = 42		N = 68		N = 61		N = 18		N = 43		N = 9		N = 23		N = 33		N = 297	
Frequently	10	23.8	13	19.1	7	11.5	4	22.2	7	16.3	1	11.1	4	17.4	7	21.2	53	17.8
Occasionally	9	21.4	16	23.5	11	18.0	1	5.6	8	18.6	2	22.2	1	4.3	8	24.2	56	18.9
Rarely	22	52.4	34	50.0	37	60.7	13	72.2	28	65.1	6	66.7	17	73.9	17	51.5	174	58.6
Not Used	1	2.4	5	7.4	6	9.8							1	4.3	1	3.0	14	4.7
Totals	42	100.0	68	100.0	61	100.0	18	100.0	43	100.0	9	100.0	23	99.9	33	99.9	297	100.0

Ventilated Animal Houses or Facilities

Ventilated animal houses or facilities were available in 13.8 percent of the 1,948 schools checking availability of this facility. The Southeast was low with 6.6 percent and the Great Lakes high with 18.6 percent availability (Table 203, p. 114). In the 268 schools having the facility, 42.9 percent of the teachers used it frequently, 16.8 percent occasionally, 32.5 percent rarely and 7.8 percent did not use this facility. Percentage patterns of use were similar in most regions.

TABLE 205

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S

USE OF VENTILATED ANIMAL HOUSE BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 118		N = 422		N = 377		N = 305		N = 191		N = 86		N = 143		N = 306		N = 1948	
No	98	83.1	361	85.5	307	81.4	285	93.4	159	83.2	79	91.9	130	90.9	261	85.3	1680	86.2
Yes	20	16.9	61	14.5	70	18.6	20	6.6	32	16.8	7	8.1	13	9.1	45	14.7	268	13.8
Totals	118	100.0	422	100.0	377	100.0	305	100.0	191	100.0	86	100.0	143	100.0	306	100.0	1948	100.0
Use	N = 20		N = 61		N = 70		N = 20		N = 32		N = 7		N = 13		N = 45		N = 268	
Frequently	9	45.0	24	39.3	26	37.1	10	50.0	14	43.7			4	30.8	28	62.2	115	42.9
Occasionally	4	20.0	8	13.1	12	17.1	3	15.0	4	12.5	5	71.4	1	7.7	8	17.8	45	16.8
Rarely	7	35.0	26	42.6	20	28.6	4	20.0	14	43.7	2	28.6	7	53.8	7	15.6	87	32.5
Not Used			3	4.9	12	17.1	3	15.0					1	7.7	2	4.4	21	7.8
Totals	20	100.0	61	99.9	70	99.9	20	100.0	32	99.9	7	100.0	13	100.0	45	100.0	268	100.0

Auto-Tutorial Laboratories

Auto-tutorial laboratories were reported in 11.3 percent of the 1,935 schools checking this item (Table 206). The Farwest reported 6.6 percent availability, while the Southwest had 13.3 percent. Of the 218 schools in the sample having this facility 48.2 percent of the science teachers used it frequently, 21.1 percent occasionally, 24.8 percent rarely and 5.9 percent did not use the auto-tutorial laboratory with their classes.

TABLE 206

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S

USE OF AUTO TUTORIAL LABORATORY BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 115		N = 418		N = 369		N = 308		N = 192		N = 88		N = 143		N = 302		N = 1935	
No	105	91.3	368	88.0	325	88.1	268	87.0	168	87.5	77	87.5	124	86.7	282	93.4	1717	88.7
Yes	10	8.7	50	12.0	44	11.9	40	13.0	24	12.5	11	12.5	19	13.3	20	6.6	218	11.3
Totals	115	100.0	418	100.0	369	100.0	308	100.0	192	100.0	88	100.0	143	100.0	302	100.0	1935	100.0
Use	N = 10		N = 50		N = 44		N = 40		N = 24		N = 11		N = 19		N = 20		N = 218	
Frequently	6	60.0	24	48.0	15	34.1	18	45.0	13	54.2	6	54.5	12	63.2	11	55.0	105	48.2
Occasionally	1	10.0	10	20.0	9	20.5	11	27.5	5	20.8	3	27.3	2	10.5	5	25.0	46	21.1
Rarely	3	30.0	15	30.0	13	29.5	8	20.0	6	25.0	2	18.2	3	15.8	4	20.0	54	24.8
Not Used			1	2.0	7	15.9	3	7.5					2	10.5			13	5.9
Totals	10	100.0	50	100.0	44	100.0	40	100.0	24	100.0	11	100.0	19	100.0	20	100.0	218	100.0

The Observatory

Of the 1,924 schools responding to this item, 8.0 percent reported the availability of an observatory for science teaching. Only small percentage variations of availability occurred among the regions (Table 207). Teacher use of the observatory was low with 76.0 percent reporting rarely using it, 14.3 percent occasionally, and 3.9 percent frequently; 5.8 percent did not use this facility when available. A check with a sample of those who used the observatory rarely provided several reasons for low use. The two major reasons were (1) difficulty in holding evening sessions, and (2) weather conditions permitting use of the observatory.

TABLE 207

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF OBSERVATORY BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 118		N = 413		N = 367		N = 311		N = 185		N = 88		N = 141		N = 301		N = 1924	
No	112	94.9	383	92.7	338	92.1	279	89.7	163	88.1	84	95.5	131	92.9	280	93.0	1770	92.0
Yes	6	5.1	30	7.3	29	7.9	32	10.3	22	11.9	4	4.5	10	7.1	21	7.0	154	8.0
Totals	118	100.0	413	100.0	367	100.0	311	100.0	185	100.0	88	100.0	141	100.0	301	100.0	1924	100.0
Use	N = 6		N = 30		N = 29		N = 32		N = 22		N = 4		N = 10		N = 21		N = 154	
Frequently			3	10.0	1	3.4			1	4.5			1	10.0			6	3.9
Occasionally	1	16.7	8	26.7	2	7.0	6	18.7	3	13.6	1	25.0			1	4.7	22	14.3
Rarely	5	83.3	18	60.0	20	68.9	26	81.3	18	81.8	3	75.0	8	80.0	19	90.5	117	76.0
Not Used			1	3.3	6	20.7							1	10.0	1	4.7	9	5.8
Totals	6	100.0	30	100.0	29	100.0	32	100.0	22	99.9	4	100.0	10	100.0	21	99.9	154	100.0

The Ham Radio Station

Amateur or ham radio stations have been located in some secondary schools for many years. Only properly licensed individuals may operate these stations. It was not surprising that only 7.9 percent of the schools reported having this facility (Table 208, p. 116). In the 152 schools reporting availability, 15.1 percent used it frequently, 11.8 percent occasionally, and 64.5 percent rarely; 8.6 percent of the teachers did not use the facility.

TABLE 208

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S

USE OF HAM RADIO STATION BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 119		N = 412		N = 361		N = 307		N = 188		N = 86		N = 142		N = 304		N = 1919	
No	107	89.9	374	90.8	323	89.5	299	97.4	173	92.0	81	94.2	136	95.8	274	90.1	1767	92.1
Yes	12	10.1	38	9.2	38	10.5	8	2.6	15	8.0	5	5.8	6	4.2	30	9.9	152	7.9
Totals	119	100.0	412	100.0	361	100.0	307	100.0	188	100.0	86	100.0	142	100.0	304	100.0	1919	100.0
Use	N = 12		N = 38		N = 38		N = 8		N = 15		N = 5		N = 6		N = 30		N = 152	
Frequently	1	8.3	7	18.4	5	13.2	1	12.5	4	26.7			1	16.7	4	13.3	23	15.1
Occasionally	1	8.3	5	13.2	4	10.5	2	25.0	2	13.3			1	16.7	3	10.0	18	11.8
Rarely	9	75.0	26	68.4	23	60.5	5	62.5	9	60.0	3	60.0	2	33.3	21	70.0	98	64.5
Not Used	1	8.3			6	15.8					2	40.0	2	33.3	2	6.7	13	8.6
Totals	12	99.9	38	100.0	38	100.0	8	100.0	15	100.0	5	100.0	6	100.0	30	100.0	152	100.0

Audio-visual Aids

Science teachers have used audio-visual aids in their classes for many years. As new and better equipment and materials became available, many science teachers have tried to obtain these aids for their science teaching. Availability of the equipment will be reported in this section of the report. How frequently the teachers used audio-visual aids is included.

Motion Picture Projectors

It is not surprising that 99.7 percent of the 2,463 schools checking this item had motion picture projectors available (Table 209). Availability was similar for all regions. About 45 percent reported using it frequently, 43.3 percent occasionally, 10.8 percent rarely; only 1.2 percent did not use this type of projector. Among the eight regions the pattern of usage was quite similar.

TABLE 209

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S

USE OF MOTION PICTURE PROJECTOR BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 144		N = 520		N = 465		N = 414		N = 249		N = 99		N = 200		N = 372		N = 2463	
No					2	0.4	5	1.2					1	0.5			8	0.3
Yes	144	100.0	520	100.0	463	99.6	409	98.8	249	100.0	99	100.0	199	99.5	372	100.0	2455	99.7
Totals	144	100.0	520	100.0	465	100.0	414	100.0	249	100.0	99	100.0	200	100.0	372	100.0	2463	100.0
Use	N = 144		N = 520		N = 463		N = 409		N = 249		N = 99		N = 199		N = 372		N = 2463	
Frequently	55	38.2	192	36.9	198	42.8	179	43.8	113	45.4	43	43.4	84	42.2	231	62.1	1095	44.6
Occasionally	73	50.7	246	47.3	216	46.7	176	43.0	102	41.0	42	42.4	86	43.2	123	33.1	1064	43.3
Rarely	15	10.4	80	15.4	47	10.1	46	11.2	28	11.2	12	12.1	23	11.6	15	4.0	266	10.8
Not Used	1	0.7	2	0.4	2	0.4	8	2.0	6	2.4	2	2.0	6	3.0	3	0.8	30	1.2
Totals	144	100.0	520	100.0	463	100.0	409	100.0	249	100.0	99	99.9	199	100.0	372	100.0	2455	99.9

The Overhead Projector

As a visual aid in science teaching the overhead projector is widely available and used in classrooms. Of the 2,441 schools responding 99.3 percent had this visual aid (Table 210). No differences occurred among the regions. In 54.1 percent of the cases teachers reported using the projector frequently, 25.6 percent occasionally, and 18.4 percent rarely; only 1.9 percent did not use the projector in their science classrooms. The high use of the overhead projector suggests that more consideration should be given to the preparation of materials for use on the overhead projector. Techniques that can be used effectively on the overhead projector should also be stressed with prospective teachers.

TABLE 210

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF OVERHEAD PROJECTOR BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 142		N = 515		N = 464		N = 407		N = 247		N = 100		N = 196		N = 370		N = 2441	
No	1	0.7	3	0.6	3	0.6	7	1.7	1	0.4			1	0.5	2	0.5	18	0.7
Yes	141	99.3	512	99.4	461	99.4	400	98.3	246	99.6	100	100.0	195	99.5	368	99.5	2423	99.3
Totals	142	100.0	515	100.0	464	100.0	407	100.0	247	100.0	100	100.0	196	100.0	370	100.0	2441	100.0
Use	N = 141		N = 512		N = 461		N = 400		N = 246		N = 100		N = 195		N = 368		N = 2423	
Frequently	62	44.0	271	52.9	262	56.8	193	48.2	136	55.3	54	54.0	111	56.9	221	60.1	1310	54.1
Occasionally	49	34.7	123	24.0	124	26.9	109	27.3	63	25.6	23	23.0	48	24.6	82	22.3	621	25.6
Rarely	29	20.6	109	21.3	72	15.6	82	20.5	42	17.1	21	21.0	31	15.9	59	16.0	445	18.4
Not Used	1	0.7	9	1.8	3	0.7	16	4.0	5	2.0	2	2.0	5	2.6	6	1.6	47	1.9
Totals	141	100.0	512	100.0	461	100.0	400	100.0	246	100.0	100	100.0	195	100.0	368	100.0	2423	100.0

Slide Projectors

Slide projectors were available in 97.2 percent of the 2,411 schools responding to this item (Table 211, p. 118). The percentages in all regions were similar. Use of the projector showed 22.1 percent using it frequently, 37.5 percent occasionally, and 37.4 percent rarely; 3.0 percent did not use it in their science classrooms. Few variations of percentage of use occurred among the regions.

TABLE 211

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF SLIDE PROJECTOR BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 140		N = 510		N = 462		N = 397		N = 245		N = 101		N = 188		N = 368		N = 2411	
No	4	2.9	9	1.8	14	3.0	25	6.3	1	0.4	2	2.0	8	4.3	5	1.4	68	2.8
Yes	136	97.1	501	98.2	448	97.0	372	93.7	244	99.6	99	98.0	180	95.7	363	98.6	2343	97.2
Totals	140	100.0	510	100.0	462	100.0	397	100.0	245	100.0	101	100.0	188	100.0	368	100.0	2411	100.0
Use	N = 136		N = 501		N = 448		N = 372		N = 244		N = 99		N = 180		N = 363		N = 2343	
Frequently	34	25.0	109	21.8	112	25.0	88	23.6	50	20.5	24	24.2	28	15.6	73	20.1	518	22.1
Occasionally	40	29.4	197	39.3	156	34.8	120	32.3	94	38.5	42	42.4	70	38.9	160	44.1	879	37.5
Rarely	58	42.6	182	36.3	174	38.8	141	37.9	93	38.1	29	29.3	76	42.2	123	33.9	876	37.4
Not Used	4	2.9	13	2.6	6	1.3	23	6.2	7	2.9	4	4.0	6	3.3	7	1.9	70	3.0
Totals	136	99.9	501	100.0	448	99.9	372	100.0	244	100.0	99	99.9	180	100.0	363	100.0	2343	100.0

Commercial Charts

Charts have been used in all the sciences as important visual aids for many years. In the 2,380 schools checking this item 96.2 percent had commercial charts available for science teaching. Only minor differences were found in percentages among the regions. Use of charts by the teachers showed 58.6 percent using them frequently, 27.2 percent occasionally, 12.3 percent rarely; only 1.9 percent did not use charts in their science teaching. Rank order of percentages were similar with only minor variations among the regions.

TABLE 212

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF COMMERCIAL CHARTS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 141		N = 507		N = 450		N = 387		N = 244		N = 97		N = 192		N = 362		N = 2380	
No	7	5.0	11	2.2	18	4.0	24	6.2	6	2.5	6	6.2	9	4.7	10	2.8	91	3.8
Yes	134	95.0	496	97.8	432	96.0	363	93.8	238	97.5	91	93.8	183	95.3	352	97.2	2289	96.2
Totals	141	100.0	507	100.0	450	100.0	387	100.0	244	100.0	97	100.0	192	100.0	362	100.0	2380	100.0
Use	N = 134		N = 496		N = 432		N = 363		N = 238		N = 91		N = 183		N = 352		N = 2289	
Frequently	80	59.7	317	63.9	241	55.8	224	61.7	131	55.0	43	47.2	111	60.6	195	55.4	1342	58.6
Occasionally	32	23.9	114	23.0	133	30.8	90	24.8	74	31.1	31	34.1	47	25.7	101	28.7	622	27.2
Rarely	21	15.7	54	10.9	54	12.5	39	10.7	26	10.9	14	15.4	21	11.5	53	15.0	282	12.3
Not Used	1	0.7	11	2.2	4	0.9	10	2.8	7	2.9	3	3.3	4	2.2	3	0.9	43	1.9
Totals	134	100.0	496	100.0	432	100.0	363	100.0	238	99.9	91	100.0	183	100.0	352	100.0	2289	100.0

The Phonograph

Of the 2,324 schools checking this item 94.8 percent reports its availability (Table 213). Use by science teachers was very low with 72.4 percent using it rarely, 17.5 percent occasionally and only 5.6 percent using the phonograph frequently. The remaining 4.5 percent of the teachers did not use it in their science classes. All regions were similar in the rank of percentage of use. A sample of teachers checked regarding use indicated that very little is available on phonograph records that is relevant to science.

TABLE 213

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF PHONOGRAPH BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 136		N = 486		N = 446		N = 381		N = 241		N = 95		N = 185		N = 354		N = 2324	
No	7	5.1	23	4.7	21	4.7	25	6.6	7	2.9	4	4.2	13	7.0	22	6.2	122	5.2
Yes	129	94.9	463	95.3	425	95.3	356	93.4	234	97.1	91	95.8	172	93.0	332	93.8	2202	94.8
Totals	136	100.0	486	100.0	446	100.0	381	100.0	241	100.0	95	100.0	185	100.0	354	100.0	2324	100.0
Use	N = 129		N = 463		N = 425		N = 356		N = 234		N = 91		N = 172		N = 332		N = 2202	
Frequently	6	4.6	36	7.8	16	3.8	25	7.0	8	3.4	8	8.8	8	4.7	17	5.1	124	5.6
Occasionally	17	13.2	87	18.8	79	18.6	89	25.0	38	16.2	21	23.1	21	12.2	33	9.9	385	17.5
Rarely	97	75.2	321	69.3	319	75.0	223	62.6	178	76.1	59	64.8	132	76.7	265	79.8	1594	72.4
Not Used	9	7.0	19	4.1	11	2.6	19	5.3	10	4.3	3	3.3	11	6.4	17	5.1	99	4.5
Totals	129	100.0	463	100.0	425	100.0	356	99.9	234	100.0	91	100.0	172	100.0	332	99.9	2202	100.0

Commercial Models

Commercial models were available in 94.4 percent of the 2,370 schools reporting this visual aid (Table 214, p. 120). Only minor variations occurred among the regions. In the 2,237 schools where models for science teaching were available 45.7 percent of the teachers used them frequently, 36.1 percent occasionally, 16.3 percent rarely and only 1.9 percent did not use them. Rank order of percentages of use was similar in all regions.

TABLE 214

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF COMMERCIAL MODELS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 143		N = 500		N = 450		N = 390		N = 240		N = 98		N = 189		N = 360		N = 2370	
No	7	4.9	21	4.2	23	5.1	37	9.5	11	4.6	14	14.3	11	5.8	9	2.5	133	5.6
Yes	136	95.1	479	95.8	427	94.9	353	90.5	229	95.4	84	85.7	178	94.2	351	97.5	2237	94.4
Totals	143	100.0	500	100.0	450	100.0	390	100.0	240	100.0	98	100.0	189	100.0	360	100.0	2370	100.0
Use	N = 136		N = 479		N = 427		N = 353		N = 229		N = 84		N = 178		N = 351		N = 2237	
Frequently	69	50.7	257	53.6	171	50.0	162	45.9	99	43.2	36	42.9	85	47.8	143	40.7	1022	45.7
Occasionally	43	31.6	147	30.7	187	43.8	129	36.5	82	35.8	27	32.1	57	32.0	135	38.5	807	36.1
Rarely	23	16.9	69	14.4	68	15.9	53	15.0	37	16.2	16	10.0	32	18.0	66	18.8	364	16.3
Not Used	1	0.7	6	1.3	1	0.2	9	2.5	11	4.8	5	6.0	4	2.2	7	2.0	44	1.9
Totals	136	99.9	479	100.0	427	99.9	353	99.9	229	100.0	84	100.0	178	100.0	351	100.0	2237	100.0

The Tape Recorder

Tape-recorders were available in 93.8 percent of the 2,337 schools checking this item (Table 215). Only slight variations occurred among the regions. Teacher use in science classes was low. It may be inferred that incompatibility of tapes and recorders for science instruction causes some of the lack of use. Ranking of use showed 69.9 percent of the teachers rarely using the recorder, 16.9 percent occasionally, 8.7 percent frequently and 4.5 percent not using it in their science classes. The order of percentage of use was similar in all regions.

TABLE 215

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF TAPE-RECORDER BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 140		N = 491		N = 444		N = 379		N = 245		N = 100		N = 184		N = 354		N = 2337	
No	7	5.0	31	6.3	22	5.0	39	10.3	8	3.3	2	2.0	15	8.2	20	5.6	144	6.2
Yes	133	95.0	460	93.7	422	95.0	340	89.7	237	96.7	98	98.0	169	91.8	334	94.4	2193	93.8
Totals	140	100.0	491	100.0	444	100.0	379	100.0	245	100.0	100	100.0	184	100.0	354	100.0	2337	100.0
Use	N = 133		N = 460		N = 422		N = 340		N = 237		N = 98		N = 169		N = 334		N = 2193	
Frequently	13	9.8	37	8.0	34	8.0	25	7.3	27	11.4	15	15.3	13	7.7	27	8.1	191	8.7
Occasionally	19	14.3	74	16.1	78	18.5	54	15.9	45	19.0	16	16.3	35	20.7	50	15.0	371	16.9
Rarely	93	69.9	328	71.3	300	71.1	242	71.2	148	62.4	63	64.3	116	68.6	242	72.4	1532	69.9
Not Used	8	6.0	21	4.6	10	2.4	19	5.6	17	7.2	4	4.1	5	3.0	15	4.5	99	4.5
Totals	133	100.0	460	100.0	422	100.0	340	100.0	237	100.0	98	100.0	169	100.0	334	100.0	2193	100.0

The Opaque Projector

The necessity of using an opaque projector in a dark room has apparently affected its usefulness. Of the 2,304 schools responding, 90.3 percent had such projectors available (Table 216). Seventy-seven percent of the teachers reported they never used it or used it occasionally. Only 5.2 percent reported using it frequently. The order of percentage of use was similar in all regions.

TABLE 216

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF OPAQUE PROJECTOR BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 135		N = 485		N = 445		N = 376		N = 235		N = 100		N = 178		N = 350		N = 2304	
No	14	10.4	42	8.7	36	8.1	53	14.1	12	5.1	8	8.0	25	14.0	33	9.4	223	9.7
Yes	121	89.6	443	91.3	409	91.9	323	85.9	223	94.9	92	92.0	153	86.0	317	90.6	2081	90.3
Totals	135	100.0	485	100.0	445	100.0	376	100.0	235	100.0	100	100.0	178	100.0	350	100.0	2304	100.0
Use	N = 121		N = 443		N = 409		N = 323		N = 223		N = 92		N = 153		N = 317		N = 2081	
Frequently	10	8.3	24	5.4	19	4.6	20	6.2	5	2.2	5	5.4	6	3.9	19	6.0	108	5.2
Occasionally	16	13.2	75	16.9	63	15.4	78	24.1	36	16.1	14	15.2	37	24.2	51	16.1	370	17.8
Rarely	90	74.4	318	71.8	318	77.8	202	62.5	170	76.2	68	73.9	104	68.0	235	74.1	1505	72.3
Not Used	5	4.1	26	5.9	9	2.2	23	7.1	12	5.4	5	5.4	6	3.9	12	3.8	98	4.7
Totals	121	100.0	443	100.0	409	100.0	323	99.9	223	99.9	92	99.9	153	100.0	317	100.0	2081	100.0

The Filmloop Projector

The filmloop projector has been available for over a decade. Many excellent science films have been produced for these projectors. Compatability of equipment and materials and costs are reported as problems for many schools. Even so, 84.0 percent of the schools reporting had a type of this projector available (Table 217, p. 122). The Southeast Region was low with 75.8 percent of the schools having such projectors and New England was high with 90.1 percent availability. This visual aid, sometimes with a sound track, was used frequently by 21.4 percent of the science teachers, 40.1 percent used it occasionally, 36.0 percent rarely and 2.5 percent did not use the projector. Major reasons for lack of use were (1) lack of available filmloops and (2) problems of compatability of equipment and filmloops.

TABLE 217

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF FILMLOOP PROJECTOR BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 141		N = 499		N = 439		N = 376		N = 235		N = 101		N = 176		N = 357		N = 2324	
No	14	9.9	57	11.4	62	14.1	91	24.2	43	18.3	18	17.8	35	19.9	52	14.6	372	16.0
Yes	127	90.1	442	88.6	377	85.9	285	75.8	192	81.7	83	82.2	141	80.1	305	85.4	1952	84.0
Totals	141	100.0	499	100.0	439	100.0	376	100.0	235	100.0	101	100.0	176	100.0	357	100.0	2324	100.0
Use	N = 127		N = 422		N = 377		N = 285		N = 192		N = 83		N = 141		N = 305		N = 1952	
Frequently	36	28.3	97	21.9	74	19.6	66	23.2	43	22.4	20	24.1	25	17.7	56	18.3	417	21.4
Occasionally	50	39.4	182	41.2	146	38.7	120	42.1	76	39.6	32	38.6	59	41.8	118	38.7	783	40.1
Rarely	41	32.3	154	34.8	151	40.1	83	29.1	68	35.4	30	36.1	51	36.2	125	41.0	703	36.0
Not Used			9	2.0	6	1.6	16	5.6	5	2.6	1	1.2	6	4.3	6	2.0	49	2.5
Totals	127	100.0	442	99.9	377	100.0	285	100.0	192	100.0	83	100.0	141	100.0	305	100.0	1952	100.0

The Micro-Projector

Of the 2,167 schools checking this item 70.0 reported it was available (Table 218). All regions were reasonably close to the national percentage. Since all areas of science were included in the sample the percentages of use may be misleading. The micro-projector was used most by biology teachers. The 1,517 teachers' responses show 62.8 percent rarely using the projector, 25.6 percent occasionally, and 8.2 percent using it frequently. Order of percentages among the regions were similar, but variations did occur in the actual percentages of use reported.

TABLE 218

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF MICRO-PROJECTOR BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 129		N = 468		N = 413		N = 340		N = 222		N = 95		N = 164		N = 336		N = 2167	
No	42	32.5	121	25.9	146	35.4	108	31.8	68	30.6	27	28.4	53	32.3	85	25.3	650	30.0
Yes	87	67.5	347	74.1	267	64.6	232	68.2	154	69.4	68	71.6	111	67.7	251	74.7	1517	70.0
Totals	129	100.0	468	100.0	413	100.0	340	100.0	222	100.0	95	100.0	164	100.0	336	100.0	2167	100.0
Use	N = 87		N = 347		N = 267		N = 232		N = 154		N = 68		N = 111		N = 251		N = 1517	
Frequently	9	10.3	37	10.7	13	4.9	18	7.8	14	9.1	4	5.9	12	10.8	18	7.2	125	8.2
Occasionally	13	14.9	86	24.8	59	22.1	69	29.7	48	31.2	18	26.5	37	33.3	58	23.1	388	25.6
Rarely	61	70.1	210	60.5	192	71.9	132	56.9	88	57.1	44	64.7	53	47.7	172	68.5	952	62.8
Not Used	4	4.6	14	4.0	3	1.1	13	5.6	4	2.6	2	2.9	9	8.1	3	1.2	52	3.4
Totals	87	99.9	347	100.0	267	100.0	232	100.0	154	100.0	68	100.0	111	99.9	251	100.0	1517	100.0

Television Receivers

Television receivers were available in 70.3 percent of the 2,206 schools checking this item (Table 219). Population density and geography may be the cause of the low of 58.5 percent in the Rocky Mountains and 62.7 percent in the Southwest. Use of television in science classrooms shows 71.1 percent of the teachers rarely use it, 19.4 percent occasionally, and 6.3 percent frequently. Only 3.2 percent indicated no use of television. Again the rank order of percentages of use among the regions was the same as that of national percentages. The lack of relevant material on TV was a major reason for low usage. Schools with access to a video tape recorder tended to use TV more than others.

TABLE 219

FREQUENCY DISTRIBUTION OF AVAILABILITY AND TEACHER'S USE OF TELEVISION BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Available	N = 134		N = 472		N = 422		N = 356		N = 230		N = 94		N = 158		N = 340		N = 2206	
No	34	25.4	109	23.1	142	33.6	110	30.9	56	24.3	39	41.5	59	37.3	107	31.5	656	29.7
Yes	100	74.6	363	76.9	280	66.4	246	69.1	174	75.7	55	58.5	99	62.7	233	68.5	1550	70.3
Totals	134	100.0	472	100.0	422	100.0	356	100.0	230	100.0	94	100.0	158	100.0	340	100.0	2206	100.0
Use	N = 100		N = 363		N = 280		N = 246		N = 174		N = 55		N = 99		N = 233		N = 1550	
Frequently	6	6.0	23	6.3	11	3.9	27	11.0	8	4.6	5	9.1	9	9.1	9	3.9	98	6.3
Occasionally	16	16.0	69	19.0	45	16.1	54	21.9	45	25.9	8	14.5	21	21.2	42	18.0	300	19.4
Rarely	76	76.0	258	71.1	222	79.3	153	62.2	113	64.9	38	69.1	63	63.6	179	76.5	1102	71.1
Not Used	2	2.0	13	3.6	2	0.7	12	4.9	8	4.6	4	7.3	6	6.1	3	1.3	50	3.2
Totals	100	100.0	363	100.0	280	100.0	246	100.0	174	100.0	55	100.0	99	100.0	233	99.7	1550	100.0

Courses Selected by Sample Teachers

General Categories of Courses Selected

Teachers were asked to select a single class by use of prepared randomization charts that were included in the questionnaire. Table 220 presents data regarding the categories of classes. Most common courses were physical science classes (including chemistry, physics, and physical science classes), accounting for 40 percent of the classes and biological science courses that accounted for about 38 percent of the classes. General Science and Earth Science courses were the next most common types of courses.

TABLE 220

FREQUENCY DISTRIBUTION OF COURSES RANDOMLY SELECTED

BY SAMPLE TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 143		N = 516		N = 465		N = 410		N = 246		N = 101		N = 200		N = 371		N = 2452	
Course Title	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Biological Science	50	35.0	160	31.0	207	44.5	139	33.9	91	37.0	38	37.6	88	44.0	151	40.7	924	37.7
Physical Science	79	55.2	203	39.3	185	39.8	152	37.1	104	42.3	35	34.6	83	41.5	141	38.0	982	40.0
Earth Science	6	4.2	57	11.0	18	3.9	24	5.9	23	9.3	8	7.9	12	6.0	18	4.9	166	6.8
General Science	6	4.2	93	18.0	45	9.7	84	20.5	20	8.1	15	14.9	8	4.0	56	15.1	327	13.3
All Others	2	1.4	3	0.6	10	2.1	11	2.6	8	3.2	5	5.0	9	4.5	5	1.3	53	2.2
Totals	143	100.0	516	99.9	465	100.0	410	100.0	246	99.9	101	100.0	200	100.0	371	100.0	2452	100.0

Classes Taught by Teachers in the Sample

The courses being taught by the teachers in the sample are shown in Table 221. For convenience the courses are organized into three groups. The first group includes only the Science Course Improvement Projects. These courses made up 29.0 percent of the total. Percentages are shown for each course where numbers were meaningful. Variations did occur among the regions with the Southwest showing a low of 15.5 percent and the Farwest 45.8 percent of the SCIP programs.

The second group, which included the so called "traditional" courses, accounted for 67.2 percent of the total. The reader should be aware that some of these courses use textbooks and materials recently developed with similar content and philosophy of the SCIP programs. A listing of textbooks for these classes does show, however, that a number of texts written before the advent of SCIP courses were still being used.

The third group were honors and advanced courses which accounted for only 3.8 percent of all courses reported. Advanced biology was the most frequently reported course in this group.

The classes selected provide a broad representation of materials being taught in the schools and with a few exceptions do not differ markedly from the population of courses offered by the sample schools.

TABLE 221

FREQUENCY DISTRIBUTION OF CLASSES RANDOMLY SELECTED

BY TEACHERS BY GROUPS OF COURSES AND BY REGIONS

	New England N = 144		Mideast N = 520		Great Lakes N = 468		Southeast N = 408		Plains N = 247		Rocky Mountains N = 99		Southwest N = 202		Farwest N = 371		Total U.S. N = 2459	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
IPS	9	6.2	13	2.5	20	4.3	16	3.9	25	10.1	10	10.1	8	4.0	16	4.3	117	4.7
ISCS	1	0.7	3	0.6	3	0.6	4	1.0	1	0.4			1	0.5	2	0.5	15	0.6
ESCP	3	2.1	18	3.5	9	1.9	7	1.7	12	4.9	1	1.0	2	1.0	3	0.8	55	2.2
BSCS Blue	2	1.4	10	1.9	16	3.4	5	1.2	6	2.4	3	3.0	2	1.0	19	5.1	63	2.6
BSCS Green	7	4.8	12	2.3	13	2.8	11	2.7	9	3.6	4	4.0	4	2.0	37	9.9	97	3.9
BSCS Yellow	8	5.5	18	3.5	53	11.3	6	1.5	4	1.6	4	4.0	4	2.0	23	6.2	120	4.9
CHEMS	6	4.2	15	2.9	22	4.7	7	1.7	7	2.8	3	3.0	5	2.5	26	7.0	91	3.7
CBA			1	0.2	1	0.2									1	0.3	3	0.1
PSSC	6	4.2	9	1.7	10	2.1	10	2.4	6	2.4	1	1.0	3	1.5	18	4.9	63	2.6
HPP	3	2.1	3	0.6	6	1.3	2	0.5	5	2.0			1	0.5	7	1.9	27	1.1
All Others	2	1.4	8	1.5	14	3.0	11	2.7	3	1.2	6	6.1	1	0.5	18	4.9	63	2.6
Sub Total	47	32.6	110	21.2	167	35.6	79	19.3	78	31.4	32	32.2	31	15.5	170	45.8	714	29.0
General Science	8	5.5	87	16.7	42	9.0	87	21.3	16	6.5	11	11.1	7	3.5	56	15.1	314	12.8
Life Science	2	1.4	19	3.6	11	2.4	27	6.6	15	6.1	13	13.1	10	4.9	6	1.6	103	4.2
Biology	14	9.7	74	14.2	85	18.2	75	18.4	39	15.8	10	10.1	53	26.2	34	9.2	384	15.6
Chemistry	21	14.6	93	17.9	70	14.9	59	14.5	39	15.8	10	10.1	31	15.3	34	9.2	357	14.5
Physics	11	7.6	42	8.1	33	7.1	18	4.4	19	7.7	5	5.1	14	6.9	13	3.5	155	6.3
Earth Science	5	3.5	44	8.4	13	2.8	16	3.9	13	5.3	6	6.1	10	4.9	10	2.7	117	4.7
Physical Science	5	3.5	17	3.3	21	4.5	34	8.3	18	7.3	10	10.1	31	15.3	16	4.3	152	6.2
All Others	8	5.5	10	1.9	13	2.8	5	1.2	3	1.2			4	2.0	28	7.5	71	2.9
Sub Total	74	51.3	386	74.1	288	61.7	321	78.6	162	65.7	65	65.7	160	79.0	197	53.1	1653	67.2
Honors			3	0.6	1	0.2											4	0.2
Adv. Biology	10	6.9	8	1.5	7	1.5	4	1.0	4	1.6	2	2.0	6	3.0	1	0.3	42	1.8
Adv. Chemistry	6	4.2	5	1.0	3	0.6	1	0.2					5	2.5	3	0.8	23	0.9
Adv Physics	6	4.2	3	0.6	1	0.2			1	0.4							11	0.4
All Others	1	0.7	5	1.0	1	0.2	3	0.7	2	0.8							12	0.5
Sub Total	23	16.0	24	4.7	13	2.7	8	1.9	7	2.8	2	2.0	11	5.5	4	1.1	92	3.8

Grade Levels of Selected Courses

The trend for courses to have all students in a single grade is shown in Table 222. When students from two or more grades were included in a course (Table 223) they usually included students from grades 11 and 12; these courses usually were chemistry, physics, biology, and physical science. These data do not differ significantly from data regarding total classes taught by the teachers. Hence, the courses selected appear to be a reasonable sample of what they were teaching.

TABLE 222

NUMBER AND PERCENTAGE OF COURSES TAUGHT AT ONE GRADE LEVEL BY REGION*

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		U.S.Total	
Grade Level	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7	2	1.4	50	9.7	24	5.1	53	13.0	18	7.3	14	14.0	10	5.0	15	4.0	186	7.6
8	6	4.3	55	10.6	21	4.5	50	12.3	30	12.2	22	22.0	14	6.9	33	8.9	231	9.4
9	18	12.8	104	20.1	87	18.6	78	19.1	51	20.8	13	13.0	41	20.3	35	9.4	427	17.4
10	37	26.2	94	18.2	109	23.3	78	19.1	34	13.9	9	9.0	52	25.7	56	15.1	469	19.1
11	15	10.6	64	12.4	22	4.7	17	4.2	8	3.3	3	3.0	5	2.5	9	2.4	143	5.8
12	29	20.6	51	9.9	42	9.0	24	5.9	22	9.0	6	6.0	16	7.9	22	5.9	212	8.6

TABLE 223

NUMBER AND PERCENTAGE OF COURSES TAUGHT AT MORE THAN ONE GRADE LEVEL BY REGION*

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		U.S.Total	
Grade Level	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7-8			1	0.2			5	1.2	3	1.2	1	1.0	1	0.5	1	0.3	12	0.5
8-9					1	0.2	2	0.5	2	0.8	3	3.0	1	0.5	1	0.3	10	0.4
9-10	2	1.4	5	1.0	18	3.8	8	2.0	2	0.8	1	1.0	5	2.5	15	4.0	56	2.3
10-11	4	2.8	8	1.5	5	1.1	10	2.5	2	0.8	1	1.0	3	1.5	10	2.7	43	1.8
11-12	22	15.6	61	11.8	72	15.4	52	12.7	43	17.6	12	12.0	35	17.3	83	22.4	380	15.5
7-8-9	1	0.7	2	0.4			4	1.0									7	0.3
9-10-11					3	0.6	1	0.2	2	0.8					5	1.3	11	0.4
10-11-12	5	3.5	22	4.2	55	11.8	20	4.9	21	8.6	15	15.0	18	8.9	73	19.7	229	9.3
9-10-11-12					9	1.9	4	1.0	6	2.4			1	0.5	12	3.2	32	1.3
Other							1	0.2									1	0.1
Ungraded							1	0.2	1	0.4					1	0.3	3	0.1

*The percentage is of the total number of classes for the region and for the country.

Size of Selected Classes

Most of the classes randomly selected by the teachers had between 20 and 34 students in them (Table 224). Classes averaging from 20 to 24 students made up 24.2 percent of the sample, those from 25 to 29 students 30.0 percent, and classes of from 30 to 34 students 21.2 percent. There were a few very small classes, usually advanced courses, and a few very large classes. It was found that the large classes were usually conducted by a team of two or more teachers. Only minor differences in average class size occurred among the regions. The lowest mean was 21.98 students in New England with a high of 27.39 students in the Farwest Region.

TABLE 224

FREQUENCY DISTRIBUTION OF SIZE OF CLASSES USED FOR SCIENCE COURSES BY REGIONS

	New England N = 141		Mideast N = 513		Great Lakes N = 460		Southwest N = 394		Plains N = 238		Rocky mountains N = 97		Southwest N = 200		Farwest N = 359		U.S. Total N = 2402	
Class Size	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
9 or less	7	5.0	7	1.3	6	1.3	7	1.8	8	3.4			6	3.0	1	0.3	42	1.7
10-14	13	9.2	21	4.1	23	5.0	19	4.8	25	10.5	5	5.2	9	4.5	9	2.5	124	5.2
15-19	22	15.6	63	12.3	58	12.6	32	8.1	32	13.4	17	17.5	24	12.0	35	9.7	283	11.8
20-24	50	35.5	134	26.1	128	27.8	82	20.8	51	21.4	20	20.6	44	22.0	72	20.1	581	24.2
25-29	37	26.2	136	26.5	163	35.4	118	29.9	77	32.4	17	17.5	59	29.5	113	31.5	720	30.0
30-34	9	6.4	121	23.6	68	14.8	103	26.1	36	15.1	30	30.9	45	22.5	97	27.0	509	21.2
35-39	2	1.4	23	4.5	10	2.2	27	6.9	4	1.7	7	7.2	10	5.0	23	6.4	106	4.4
40-44	1	0.7	4	0.8	2	0.4	5	1.3	4	1.7			2	1.0	6	1.7	24	1.0
45-Up			4	0.8	2	0.4	1	0.3	1	0.4	1	1.0	1	0.5	3	0.8	13	0.5
Totals	141	100.0	513	100.0	460	99.9	394	100.0	238	100.0	97	99.9	200	100.0	359	100.0	2402	100.0

Types of Science Classrooms

Among the classes selected by the sample of teachers 86.2 percent were taught in rooms they classified as laboratory-classrooms (Table 225). Rooms with portable kits or a portable demonstration desk made up 6.3 percent of the sample. Only 3.2 percent of the rooms had no science facilities. The remaining 4.3 percent were classified as other types of rooms or facilities. No extreme variations were reported among the regions.

TABLE 225

FREQUENCY DISTRIBUTION OF TYPES OF CLASSROOMS USED FOR SCIENCE COURSES BY REGIONS

	New England N = 143		Mideast N = 518		Great Lakes N = 466		Southeast N = 409		Plains N = 243		Rocky Mountains N = 99		Southwest N = 202		Farwest N = 365		Total U.S. N = 2445	
Classroom Type	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Laboratory-Classroom	123	86.0	435	84.0	424	91.0	332	81.2	204	84.0	84	84.8	178	88.1	328	89.9	2108	86.2
With Only Portable Kits	8	5.6	38	7.3	17	3.6	36	8.8	23	9.5	6	6.1	10	5.0	15	4.1	153	6.3
With No Science Facilities	7	4.9	21	4.1	6	1.3	28	6.8	3	1.2	3	3.0	3	1.5	7	1.9	78	3.2
Other Rooms	5	3.5	24	4.6	19	4.1	13	3.2	13	5.3	6	6.1	11	5.4	15	4.1	106	4.3
Totals	143	100.0	518	100.0	466	100.0	409	100.0	243	100.0	99	100.0	202	100.0	365	100.0	2445	100.0

Curriculum Materials for Selected Class

With 2,411 teachers responding to this item, 22.9 percent reported using a single textbook (Table 226). Another 18.2 percent used a textbook which included the laboratory manual. Multiple textbooks were reported by 13.3 percent of the teachers and 11.3 percent reported the use of multiple laboratory manuals. The largest group used textbooks with a separate accompanying laboratory manual, 25.8 percent. All other combinations of curriculum materials made up the remaining 7.7 percent reporting. The only extreme variation among the regions was a 35.1 percent use of a single textbook in the Southeast.

TABLE 226

FREQUENCY DISTRIBUTION OF TYPES OF CURRICULUM MATERIALS

USED FOR SCIENCE COURSES BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 141		N = 511		N = 460		N = 402		N = 237		N = 98		N = 201		N = 361		N = 2411	
Type of Materials	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Single Text	27	19.1	118	23.1	110	23.9	141	35.1	46	19.4	21	21.4	43	21.4	46	12.7	552	22.9
Lab Manual	6	4.3	3	0.6	4	0.9	3	0.7	1	0.4			2	1.0			19	0.8
Lab Manual in Text	23	16.3	63	12.3	98	21.3	65	16.2	64	27.0	21	21.4	27	13.4	79	21.9	440	18.2
Multiple Texts	15	10.6	100	19.5	40	8.7	41	10.2	24	10.1	15	15.3	20	10.0	66	18.3	321	13.3
Multiple Texts & Lab Manual	19	13.5	71	14.0	46	10.0	31	7.7	24	10.1	11	11.2	20	10.0	50	13.8	272	11.3
Separate Text & Lab Manual	49	34.8	119	23.3	137	29.8	86	21.4	53	22.4	14	14.3	71	35.3	93	25.8	622	25.8
Other Combinations	2	1.4	37	7.2	25	5.4	35	8.7	25	10.5	16	16.3	18	8.9	27	7.5	195	7.7
Totals	141	100.0	511	100.0	460	100.0	402	100.0	237	99.9	98	99.9	201	100.0	361	100.0	2411	100.0

Publication Dates of Textbooks

Frequency distribution of publication date of the textbook used in sampled classes as reported by the teachers is shown in Table 227, p. 129. Most of the textbooks were published between 1965 and 1969. This indicates that books being used in the spring of 1971 were mostly from two to six years old. Most sample schools contacted regarding textbook selection indicated they were on 3-5 year adoption cycles.

Some schools were using materials more than 8 years old as primary textbooks. Very few schools were using textbooks that were more than 10 years old.

TABLE 227

FREQUENCY DISTRIBUTION OF PUBLICATION DATES

OF MAJOR TEXTBOOKS USED BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 138		N = 497		N = 429		N = 396		N = 233		N = 93		N = 195		N = 338		N = 2319	
Dates	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1958 or older			4	0.8			4	1.0			1	1.0			4	1.2	13	0.6
1959			2	0.4	3	0.7	2	0.5							2	0.6	9	0.4
1960	1	0.7	16	3.2	5	1.2	3	0.8	3	1.3			2	1.0	10	2.9	40	1.7
1961			4	0.8	4	0.9	3	0.8	2	0.9	2	2.1			4	1.2	19	0.8
1962	5	3.6	5	1.0	6	1.4	17	4.3	4	1.7			2	1.0	11	3.3	550	2.2
1963	11	8.0	29	5.8	65	15.1	27	6.8	14	6.0	8	8.6	4	2.1	37	10.9	195	8.4
1964	6	4.3	18	3.6	22	5.1	30	7.6	13	5.6	6	6.4	6	3.1	14	4.1	115	5.0
1965	8	5.8	77	15.5	72	16.8	63	15.9	28	12.0	6	6.4	27	13.8	54	16.0	335	14.4
1966	16	11.6	91	18.3	53	12.4	51	12.8	38	16.3	13	14.0	44	22.6	29	8.6	335	14.4
1967	10	7.2	48	9.7	34	7.9	44	11.1	41	17 6	13	14.0	14	7.2	38	11.2	242	10.4
1968	45	32.6	99	19.9	90	21.0	72	18.2	52	22.3	21	22.6	45	23.1	78	23.1	502	21.6
1969	18	13.0	62	12.5	46	10.7	53	13.4	18	7.7	10	10.8	33	16.9	31	9.2	271	11.7
1970	16	11.6	42	8.5	29	6.8	27	6.8	20	8.6	13	14.0	18	9.2	20	5.9	185	8.0
1971	2	1.4													6	1.8	8	0.3
Totals	138	99.8	497	100.0	429	100.0	396	100.0	233	100.0	93	99.9	195	100.0	338	100.0	2319	99.9

Textbooks Used in the Selected Classes

Major textbooks used in the selected classes included a large number of titles. Only those titles most frequently reported are shown in Table 228, p. 130. Of 2,384 books listed as the major book used in the course 39.5 percent occurred so infrequently that the percentages would be meaningless. Many of these were also found to be older materials by the publication dates reported.

The percentages reported are of the total textbooks reported. Hence, percentage of use of textbooks at any one level is considerably higher than the percentage reported in this table. Relative comparisons can be made by comparing textbooks listed (for example, biology) and computing percents. Such percents are relatively close to actual comparative percentage of use during 1970-71.

TABLE 228

PERCENTAGE OF TEXTBOOKS MOST FREQUENTLY USED IN SCIENCE COURSES BY REGIONS*

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 140		N = 497		N = 456		N = 402		N = 242		N = 94		N = 196		N = 357		N = 2384	
Text Code	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
001	8		12		19		16		25		9		10		14		113	4.7
003	1		15		8		6		14		2		2		3		51	2.1
005	4		14		17		7		8		3		3		18		74	3.1
006	8		12		11		12		10		7		5		39		104	4.3
007	10		21		49		7		6		4		9		18		124	5.2
008	6		13		15		2		6		2		4		20		68	2.9
010	6		13		12		12		7		2		2		19		73	3.0
011	3		1		3		3		4				1		6		21	0.8
012	1		2		5		2		1		1				10		22	0.9
041	2		5		3		6								4		20	0.8
101	9		29		48		51		18		3		27		24		209	8.7
105			1		14		8		2		1		11		5		42	1.7
116			5		2		10		2		1		3		1		24	1.0
201	17		37		28		30		16		4		19		16		167	7.0
214	2		13		9		8		2				10		3		47	1.9
301	9		22		22		9		13		5		6		4		90	3.7
306	3		10		9		13		8		3		6		9		61	2.5
403	1		13		2		2		1		1		3		3		26	1.0
405	1		14		6		6		5		3		1		3		39	1.6
501					5		11				1				3		20	0.8
502	1		1		5		4		1		1		1		1		15	0.6
542	2		10		2								2		1		17	0.7
603	1		3		1		1		3		2						11	0.4
604			2				5				1		1				9	0.3
All Others	45		229		161		171		90		38		70		133		937	39.5
Totals	140		497		456		402		242		94		196		357		2384	99.2

001 Introductory Physical Science (IPS) Prentice-Hall
003 Earth Science Curriculum Project (ESCP) Houghton-Mifflin
005 (BSCS Blue) Molecules to Man Houghton-Mifflin
006 (BSCS Green) High School Biology Rand-McNally
007 (BSCS Yellow) Inquiry Into Life Harcourt-Brace
008 (CHEMS) Chemistry: An Experimental Science W.H. Freeman
010 (PSSC) Physics D.C. Heath
011 Project Physics (PP) Holt, Rhinehart & Winston
012 (BSCS Purple) Patterns and Processes
041 Interaction of Matter and Energy (IME)
101 Modern Biology Holt, Rhinehart & Winston
105 Biology Silver Burdett
116 Life - Its Forms and Changes Harcourt-Brace
125 Living Things Holt, Rhinehart & Winston
201 Modern Chemistry Holt, Rhinehart & Winston
214 Chemistry - A Modern Course C. Merrill
301 Modern Physics Holt, Rhinehart & Winston
306 Modern Physical Science Holt, Rhinehart & Winston
316 Physical Science - A Modern Approach Van Nostrand
403 Earth Science, The World We Live In Van Nostrand
405 Modern Earth Science Holt, Rhinehart & Winston
501 Modern Science I Holt, Rhinehart & Winston
502 Principles of Science Charles Merrill
542 Pathways in Science Series Globe
603 Life and the Molecule: The Biological Sciences Harper & Row
604 Exploring Life Science Allyn & Bacon

Ranking of Importance of Learning Activities

Teachers in the sample were asked to rank three teaching methods or learning activities as most important, next most important and third most important. They were also asked to check any other methods they used as listed in the questionnaire (Appendix B, p. 160). Tables showing the ranks are arranged in order of percentages of those ranked most important. The data is presented in Table 229, p.131 through Table 241, p.136. Because the frequency distributions are quite similar in all regions, the tables will not all be discussed individually. More important use of these data will be found in a second correlational study to be published later.

Lecture-discussion as a learning activity was ranked of most importance by 55.2 percent of the teachers (Table 229). Also 18.4 percent ranked it next most important. Only 7.2 percent did not check lecture-discussion as a method they used.

TABLE 229

FREQUENCY DISTRIBUTION OF IMPORTANCE OF LECTURE - DISCUSSION AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	74	51.4	303	58.1	261	55.8	254	61.2	127	51.0	44	43.6	107	53.0	195	52.4	1365	55.2
Next Most	31	21.5	89	17.1	90	19.2	62	14.9	43	17.3	22	21.8	39	19.3	79	21.2	455	18.4
Third Most	14	9.7	41	7.9	44	9.4	22	5.3	25	10.0	7	6.9	15	7.4	37	10.0	205	8.3
Used	11	7.6	48	9.2	40	8.6	49	11.8	26	10.4	21	20.8	26	2.9	43	11.6	264	10.7
Not Ranked	14	9.7	40	7.7	33	7.0	28	6.8	28	11.2	7	6.9	15	7.4	18	4.8	183	7.4
Totals	144	99.9	521	100.0	468	100.0	415	100.0	249	99.9	101	100.0	202	100.0	372	100.0	2472	100.0

Group laboratory showed 14.8 percent of the teachers ranking it most important, 27.2 percent next most important, and 14.4 percent third most important (Table 231). Another 22.6 percent checked that they used group laboratory as a learning activity while 20.0 percent did not check any use of this method.

TABLE 230

FREQUENCY DISTRIBUTION OF IMPORTANCE OF GROUP LABORATORY AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	27	18.7	61	11.7	67	14.3	42	10.0	40	16.1	18	17.8	22	10.9	88	23.7	365	14.8
Next Most	42	29.2	134	25.7	147	31.4	92	22.2	74	29.7	24	23.8	53	26.2	107	23.8	673	27.2
Third Most	28	19.4	93	17.9	67	14.3	70	16.9	33	13.2	14	13.9	27	13.4	50	13.4	382	15.4
Used	25	17.4	112	21.5	104	22.2	113	27.2	55	22.1	25	24.7	57	28.2	67	18.0	558	22.6
Not Ranked	22	15.3	121	23.2	83	17.7	98	23.6	47	18.9	20	19.8	43	21.3	60	16.1	494	20.0
Totals	144	100.0	521	100.0	468	99.9	415	99.9	249	100.0	101	100.0	202	100.0	372	100.0	2472	100.0

Individual laboratory was ranked most important by 11.1 percent of the teachers and 16.7 percent next most important (Table 231). Another 27.0 percent checked that they used this method, but 36.4 percent did not indicate any use of this learning activity.

TABLE 231

FREQUENCY DISTRIBUTION OF IMPORTANCE OF INDIVIDUAL LABORATORY AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	12	8.3	52	10.0	64	13.7	27	6.5	30	12.1	17	16.8	26	12.9	47	12.6	275	11.1
Next Most	23	16.0	84	16.1	89	19.0	46	11.1	42	16.9	16	15.8	37	18.3	75	20.2	412	16.7
Third Most	15	10.4	49	9.4	48	10.2	30	7.2	26	10.4	9	8.9	15	7.4	26	7.0	218	8.8
Used	34	23.6	150	28.8	123	26.3	115	27.7	71	28.5	27	26.7	57	28.2	91	24.5	668	27.0
Not Ranked	60	41.7	186	35.7	144	30.8	197	47.5	80	32.1	32	31.7	67	33.2	133	35.7	899	36.4
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	100.0	101	99.9	202	100.0	372	100.0	2472	100.0

All of the other learning activities were ranked most important by less than 10 percent of the teachers. Science demonstrations, however, did show 13.1 percent of the teachers ranking it next most important and 18.9 percent ranked it third most important (Table 232).

TABLE 232

FREQUENCY DISTRIBUTION OF IMPORTANCE OF SCIENCE DEMONSTRATIONS AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	3	2.1	22	4.2	13	2.8	14	3.4	2	0.8	3	3.0	3	1.5	7	1.9	67	2.7
Next Most	21	14.6	107	20.5	47	10.0	62	14.9	28	11.2	14	13.9	17	8.4	28	7.5	324	13.1
Third Most	35	24.3	116	22.3	84	17.9	76	18.3	36	14.5	14	13.9	44	21.8	63	16.9	468	18.9
Used	50	34.7	166	31.9	188	40.2	172	41.5	111	44.6	45	44.5	92	45.5	178	47.9	1002	40.5
Not Ranked	35	24.3	110	21.1	136	29.1	91	21.9	72	28.9	25	24.7	46	22.8	96	25.8	611	24.7
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2472	99.9

Summary of Learning Activities

Teachers in the sample indicated lecture-discussion, instructional films, group laboratory and to a lesser extent individual laboratory as the most important learning activities used in their science classes. However, there was considerable emphasis on science demonstrations.

TABLE 233

FREQUENCY DISTRIBUTION OF IMPORTANCE OF INSTRUCTIONAL FILMS AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

Rank of Use	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 415		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2472	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most			1	0.2	6	1.3	4	1.0	2	0.8	1	1.0	1	0.5	4	1.1	19	0.8
Next Most	6	4.2	23	4.4	22	4.7	43	10.3	7	2.8			7	3.5	12	3.2	120	4.8
Third Most	21	14.6	76	14.6	76	16.2	79	19.0	39	15.7	11	10.9	30	14.8	78	21.0	410	16.6
Used	81	56.2	267	51.2	241	51.3	192	46.3	133	53.4	62	61.4	103	51.0	194	52.1	1273	51.5
Not Ranked	36	25.0	154	29.6	123	26.3	97	23.4	68	27.3	27	26.7	61	30.2	84	22.6	650	26.3
Totals	144	100.0	521	100.0	468	99.8	415	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2472	100.0

TABLE 234

FREQUENCY DISTRIBUTION OF IMPORTANCE OF LECTURE AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

Rank of Use	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 415		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2472	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	17	11.8	44	8.4	48	10.3	29	7.0	12	4.8	4	4.0	22	10.9	11	3.0	187	7.6
Next Most	12	8.3	24	4.6	30	6.4	20	4.8	8	3.2	3	3.0	13	6.4	17	4.6	127	5.1
Third Most	7	4.9	30	5.8	35	7.5	22	5.3	12	4.8	5	4.9	12	5.9	22	5.9	145	5.9
Used	39	27.1	165	31.7	151	32.2	132	31.8	91	36.6	36	35.6	67	33.2	127	34.1	808	32.7
Not Ranked	69	47.9	258	49.5	204	43.6	212	51.1	126	50.6	53	52.5	88	43.6	195	52.4	1205	48.7
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2472	100.0

TABLE 235

FREQUENCY DISTRIBUTION OF IMPORTANCE OF INDEPENDENT STUDY AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	5	3.5	10	1.9	13	2.8	12	2.9	16	6.4	6	5.9	3	1.5	12	3.2	77	3.1
Next Most	2	1.4	9	1.7	10	2.1	12	2.9	11	4.4	2	2.0	10	4.9	12	3.2	68	2.8
Third Most	10	6.9	25	4.8	25	5.3	16	3.8	15	6.0	10	9.9	14	6.9	24	6.5	139	5.6
Used	36	25.0	180	34.6	168	35.9	182	43.9	95	38.2	35	34.7	87	43.1	140	37.6	923	37.3
Not Ranked	91	63.2	297	57.0	252	53.8	193	46.5	112	45.0	48	47.5	88	43.6	184	49.5	1265	51.2
Totals	144	100.0	521	100.0	468	99.9	415	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2472	100.0

TABLE 236

FREQUENCY DISTRIBUTION OF IMPORTANCE OF SMALL GROUP DISCUSSION AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	4	2.8	10	1.9	14	3.0	12	2.9	8	3.2	3	3.0	5	2.5	9	2.4	65	2.6
Next Most	9	6.3	19	3.6	24	5.1	23	5.5	14	5.6	4	3.9	11	5.4	14	3.8	118	4.8
Third Most	11	7.6	30	5.8	34	7.3	23	5.5	20	8.0	12	11.9	11	5.4	22	5.9	163	6.6
Used	36	25.0	139	26.7	141	30.1	116	28.0	81	32.5	29	28.7	62	30.7	95	25.5	699	28.3
Not Ranked	84	58.3	323	62.0	255	54.5	241	58.1	126	50.6	53	52.5	113	55.9	232	62.4	1427	57.7
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	99.9	101	100.0	202	99.9	372	100.0	2472	100.0

TABLE 237

FREQUENCY DISTRIBUTION OF IMPORTANCE OF PROGRAMED INSTRUCTION AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most			4	0.8			2	0.5	2	0.8	1	1.0	1	0.5	1	0.3	11	0.4
Next Most			5	1.0	6	1.3	1	0.2			1	1.0			5	1.3	18	0.7
Third Most	5	3.5	7	1.3	3	0.6	4	1.0	6	2.4	1	1.0	2	1.0	3	0.8	31	1.3
Used	15	10.4	49	9.4	48	10.3	32	7.7	32	12.9	11	10.9	24	11.9	52	14.0	263	10.6
Not Ranked	124	86.1	456	87.5	411	87.8	376	90.6	209	83.9	87	86.1	175	86.6	311	83.6	2149	86.9
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2472	99.9

TABLE 238

FREQUENCY DISTRIBUTION OF IMPORTANCE OF TELEVISED INSTRUCTION

AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

Rank of Use	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 415		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2472	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most					1	0.2	2	0.5			1	1.0					4	0.2
Next Most			1	0.2			2	0.5	1	0.4							4	0.2
Third Most	4	2.8	1	0.2	2	0.4	3	0.7					3	1.5	1	0.3	14	0.6
Used	12	8.3	57	10.9	26	5.6	39	9.4	21	8.4	10	9.9	17	8.4	27	7.2	209	8.4
Not Ranked	128	88.9	462	88.7	439	93.8	369	88.9	227	91.2	90	89.1	182	90.1	344	92.5	2241	90.6
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2472	100.0

TABLE 239

FREQUENCY DISTRIBUTION OF IMPORTANCE OF EXCURSIONS OR FIELD STUDIES

AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

Rank of Use	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 415		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2472	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most					1	0.2												
Next Most	1	0.7	2	0.4	5	1.1	3	0.7					1	0.5			2	0.1
Third Most	5	3.5	10	1.9	8	1.7	6	1.5	4	1.6	1	1.0	1	0.5	2	0.5	14	0.6
Used	31	21.5	158	30.3	143	30.6	116	27.9	75	30.1	34	33.7	2	1.0	7	1.9	43	1.7
Not Ranked	107	74.3	351	67.4	311	66.4	290	69.9	170	68.3	66	65.3	60	29.7	94	25.3	711	28.8
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	100.0	101	100.0	138	68.3	269	72.3	1702	68.8
													202	100.0	372	100.0	2472	100.0

TABLE 240

FREQUENCY DISTRIBUTION OF IMPORTANCE OF IN-CLASS WRITTEN ASSIGNMENTS

AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

Rank of Use	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 415		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2472	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	1	0.7	5	1.0	5	1.1	9	2.2	4	1.6	1	1.0	4	2.0	9	2.4	38	1.5
Next Most	4	2.8	14	2.7	29	6.2	39	9.4	13	5.2	11	11.0	9	4.4	33	8.9	152	6.1
Third Most	8	5.6	30	5.7	49	10.5	43	10.4	27	10.8	15	14.8	24	11.9	40	10.7	236	9.5
Used	47	32.6	201	38.6	199	42.5	177	42.5	125	50.2	45	44.5	99	49.0	160	43.0	1053	42.6
Not Ranked	84	58.3	271	52.0	186	39.7	147	35.4	80	32.1	29	28.7	66	32.7	130	35.0	993	40.2
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	99.9	101	100.0	202	100.0	372	100.0	2472	99.9

TABLE 241

FREQUENCY DISTRIBUTION OF IMPORTANCE OF AUTO-TUTORIAL INSTRUCTION AS A LEARNING ACTIVITY AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southwest		Plains		Rocky Mountains		Southwest		Farwest		U.S. Total	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most					1	0.2			1	0.4			1	0.5			3	0.1
Next Most			3	0.6	3	0.6			3	1.2					1	0.3	10	0.4
Third Most	3	2.1	6	1.1	4	0.9	3	0.7					3	1.5	1	0.3	20	0.8
Used	5	3.5	30	5.8	27	5.8	19	4.6	16	6.4	7	6.9	17	8.4	11	2.9	132	5.3
Not Ranked	136	94.4	482	92.5	433	92.5	393	94.7	229	92.0	94	93.1	181	89.6	359	96.5	2307	93.3
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2472	99.9

Ranking of Importance of Grading Methods

Teachers were asked to rank six methods of evaluation of their students' achievement in the science classes sampled. Frequency distributions of the importance of the grading methods used are similarly ordered for all the regions on all six methods.

Test scores were ranked as most important by 66.5 percent of the teachers; 13.9 percent ranked them as next most important (Table 242). Performance in laboratory work was ranked most important by 14.9 percent of the teachers and 35.9 percent ranked it next most important (Table 243, p. 137).

TABLE 242

FREQUENCY DISTRIBUTION OF IMPORTANCE OF TEST SCORES AS A GRADING METHOD AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	104	72.6	375	72.0	333	71.2	272	65.5	172	69.1	54	53.5	115	56.9	220	59.1	1645	66.5
Next most	21	14.5	56	10.7	58	12.4	55	13.3	28	11.2	15	14.8	30	14.9	80	21.5	343	13.9
Third most	7	4.8	46	8.8	38	8.1	35	8.4	27	10.8	15	14.8	35	17.3	32	8.6	235	9.5
Used	1	0.6	19	3.7	17	3.6	18	4.3	5	2.0	10	9.9	10	5.0	16	4.3	96	3.9
Not ranked	11	7.5	25	4.8	22	4.7	35	8.4	17	6.8	7	6.9	12	5.9	24	6.5	153	6.2
Totals	144	100.0	521	100.0	468	100.0	415	99.9	249	99.9	101	99.9	202	100.0	372	100.0	2472	100.0

TABLE 243

FREQUENCY DISTRIBUTION OF IMPORTANCE OF PERFORMANCE IN LABORATORY WORK AS A GRADING METHOD AS RANKED BY TEACHERS BY REGIONS

Rank of Use	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southwest N = 415		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		U.S. Total N = 2472	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	25	17.4	67	12.9	64	13.7	55	13.7	32	12.9	19	18.8	26	12.9	81	21.8	369	14.9
Next Most	64	44.4	193	37.0	188	40.2	105	25.3	90	36.1	30	29.7	71	35.2	146	39.3	887	35.9
Third Most	28	19.4	96	18.0	110	23.5	72	17.4	62	24.9	19	18.8	56	27.7	76	20.4	517	20.9
Used	5	3.5	51	9.8	26	5.5	40	9.6	16	6.4	8	7.9	17	8.4	21	5.6	184	7.4
Not Ranked	22	15.3	116	22.3	80	17.1	143	34.5	49	19.7	25	24.8	32	15.8	48	12.9	515	20.8
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2472	99.9

Written assignments were ranked by 8.8 percent of the teachers as most important, 28.5 percent next most important and 27.3 percent third most important in grading student achievement (Table 244). However, 27.1 percent did not check this item as being used for grading purposes.

TABLE 244

FREQUENCY DISTRIBUTION OF IMPORTANCE OF WRITTEN ASSIGNMENTS AS A GRADING METHOD AS RANKED BY TEACHERS BY REGIONS

Rank of Use	New England N = 144		Mideast N = 521		Great Lakes N = 468		Southeast N = 415		Plains N = 249		Rocky Mountains N = 101		Southwest N = 202		Farwest N = 372		Total U.S. N = 2472	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	3	2.1	19	3.6	43	9.2	37	8.9	24	9.6	14	13.9	30	14.8	47	12.6	217	8.8
Next Most	23	16.0	123	23.6	154	32.9	127	30.6	80	32.1	36	35.6	64	31.7	97	26.1	704	28.5
Third Most	42	29.2	151	29.0	110	23.5	99	23.9	70	28.1	27	26.7	40	19.3	137	36.8	676	27.3
Used	13	8.3	55	10.6	33	7.1	37	8.9	15	6.0	7	6.9	21	10.4	25	6.7	205	8.3
Not Ranked	63	43.5	173	33.2	128	27.3	115	27.7	60	24.1	17	16.8	47	23.3	66	17.7	670	27.1
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	99.9	101	99.9	202	99.5	372	99.9	2472	100.0

The use of student participation in class discussion as a grading method was not checked by 47.9 percent of the teachers (Table 245, p. 138). About four percent of the teachers ranked it most important, 13.7 percent next in importance, 22.7 percent third in importance.

TABLE 245

FREQUENCY DISTRIBUTION OF IMPORTANCE OF PARTICIPATION IN CLASS DISCUSSION AS A GRADING METHOD AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	6	4.2	33	6.3	19	4.1	23	5.5	2	0.8			15	7.4	7	1.9	105	4.2
Next most	22	15.3	102	19.6	48	10.3	81	19.5	28	11.2	10	9.9	19	9.4	28	7.5	338	13.7
Third most	43	29.8	138	26.5	114	24.3	103	24.8	47	18.9	20	19.8	32	15.8	64	17.2	561	22.6
Used	11	7.6	48	9.2	65	14.1	42	10.1	36	14.5	13	12.9	31	15.4	44	11.8	291	11.7
Not ranked	62	43.0	200	38.4	221	47.2	166	40.0	136	54.6	58	57.4	105	52.0	229	61.6	1177	47.6
Totals	144	100.0	521	100.0	468	100.0	415	99.9	249	100.0	101	100.0	202	100.0	372	100.0	2472	100.0

The other two grading methods were ranked quite low at all levels of importance. Performance in science projects was not used by 79.3 percent of the teachers (Table 246). Student interest in science was not used for grading purposes by 86.0 percent of the teachers (Table 247).

TABLE 246

FREQUENCY DISTRIBUTION OF IMPORTANCE OF PERFORMANCE IN SCIENCE PROJECTS AS A GRADING METHOD AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most	1	0.7	3	0.6	2	0.4	3	0.7	1	0.4	5	4.9	2	1.0	2	0.5	19	0.8
Next most	8	5.6	15	2.9	14	3.0	8	1.9	9	3.6	3	3.0	3	1.5	12	3.2	72	2.9
Third most	5	3.5	24	4.5	23	4.9	37	8.9	11	4.4	7	6.9	10	9.4	14	3.8	140	5.7
Used	9	6.2	56	10.7	39	8.3	62	14.9	34	13.7	10	9.9	32	15.8	38	10.2	280	11.3
Not ranked	121	84.0	423	81.2	390	83.3	305	73.5	194	77.9	76	75.3	146	72.3	306	82.3	1961	79.3
Totals	144	100.0	521	99.9	468	99.9	415	99.9	249	100.0	101	100.0	202	100.0	372	100.0	2472	100.0

TABLE 247

FREQUENCY DISTRIBUTION OF IMPORTANCE OF STUDENT INTEREST IN SCIENCE AS A GRADING METHOD AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		U.S. Total	
	N = 144		N = 521		N = 468		N = 415		N = 249		N = 101		N = 202		N = 372		N = 2472	
Rank of Use	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Most			1	0.2	4	0.9	5	1.2					2	1.0			12	0.5
Next Most	1	0.7	6	1.2	9	1.9	8	1.9	2	0.8	1	1.0	4	2.0	4	1.1	35	1.4
Third Most	5	3.5	14	2.7	20	4.3	25	6.0	7	2.8	1	1.0	6	3.0	7	1.9	85	3.4
Used	13	9.0	58	11.1	37	7.9	43	10.4	15	6.0	9	8.9	22	10.9	16	4.3	213	8.6
Not Ranked	125	86.8	442	84.8	398	85.0	334	80.5	225	90.4	90	89.1	168	83.1	345	92.7	2127	86.0
Totals	144	100.0	521	100.0	468	100.0	415	100.0	249	100.0	101	100.0	202	100.0	372	100.0	2472	99.9

Summary

From the six tables of data it seems that test scores rank highest as a method of grading. Next was performance in laboratory work followed by written assignments and participation in class discussion. Apparently little use was made of science projects or student interest in science for evaluating student achievement.

Employment Status of Teachers

Table 248 indicates that 98.9 percent of the sample were regularly employed full-time teachers. Of all others, 0.6 percent were part-time teachers, 0.2 percent were classified as substitute teachers, while 0.3 percent had some other classification. The study did not attempt to determine the level of certification of the science teacher.

TABLE 248

FREQUENCY DISTRIBUTION OF THE SAMPLE OF TEACHERS

BY EMPLOYMENT STATUS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 142		N = 518		N = 464		N = 413		N = 248		N = 100		N = 201		N = 372		N = 2458	
Employment Status	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Full-time	138	97.2	515	99.4	461	99.4	407	98.5	246	99.2	97	97.0	200	99.5	368	98.9	2432	98.9
Part-time	4	2.8	3	0.6			4	1.0	1	0.4			1	0.5	1	0.3	14	0.6
Substitute					1	0.2			1	0.4	1	1.0			2	0.5	5	0.2
Other					2	0.4	2	0.5			2	2.0			1	0.3	7	0.3
Totals	142	100.0	518	100.0	464	100.0	413	100.0	248	100.0	100	100.0	201	100.0	372	100.0	2458	100.0

Evaluation of Factors Needed for High Quality Science Programs

Teachers in the sample were asked to rank the importance of nine factors they considered important for obtaining and maintaining a high quality science program. The evaluation was made on a five point scale with (5) being most important and (1) not important. Numbers were reversed from those in the questionnaire for computing correlations.

Tables are presented in order of highest percentages of importance as ranked by the teachers. Means and standard deviations are given for all tables.

Science Facilities

Of the 2,454 teachers responding, 71.8 percent ranked science facilities as a high importance for a quality science program (Table 249). A rank of four in importance was checked by another 22.0 percent of the teachers. Means varied slightly among the regions with a low of 4.5 in the Rocky Mountains to a high of 4.7 in the Southwest.

TABLE 249

FREQUENCY DISTRIBUTION OF IMPORTANCE OF SCIENCE FACILITIES FOR A HIGH QUALITY SCIENCE PROGRAM AS RANKED BY TEACHERS BY REGIONS

	New England N = 143		Mideast N = 517		Great Lakes N = 465		Southeast N = 409		Plains N = 249		Rocky Mountains N = 99		Southwest N = 201		Farwest N = 371		U.S. Total N = 2454	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	102	71.3	383	74.1	323	69.5	325	79.4	168	67.5	68	68.7	148	73.6	246	66.3	1763	71.8
4	33	23.1	98	18.9	117	25.1	67	16.4	66	26.5	26	26.3	41	20.4	92	24.8	540	22.0
3	6	4.7	35	6.8	19	4.1	13	3.2	13	5.2	5	5.0	9	4.5	29	7.8	129	5.3
2	1	0.7			5	1.1	2	0.5	1	0.4			2	1.0	3	0.8	14	0.6
Low 1	1	0.7	1	0.2	1	0.2	2	0.5	1	0.4			1	0.5	1	0.3	8	0.3
Totals	143	100.0	517	100.0	465	100.0	409	100.0	249	100.0	99	100.0	201	100.0	371	100.0	2454	100.0

Administrative Support

Teachers ranked administrative support as of high importance in 61.2 percent of the cases (Table 250). It was ranked at the four level by another 27.2 percent. Means ranged from a low of 4.4 of importance in New England to a high of 4.5 in the Farwest.

TABLE 250

FREQUENCY DISTRIBUTION OF IMPORTANCE OF ADMINISTRATIVE SUPPORT FOR A HIGH QUALITY SCIENCE PROGRAM AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 516		N = 466		N = 405		N = 248		N = 98		N = 200		N = 370		N = 2447	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	82	56.7	307	59.5	280	60.1	260	64.2	144	58.1	65	66.3	120	60.0	241	65.1	1499	61.2
4	40	27.8	141	27.3	132	28.3	108	26.7	73	29.4	25	25.5	60	30.0	87	23.5	666	27.2
3	17	11.8	51	9.9	38	8.1	29	7.2	25	10.1	7	7.1	17	8.5	31	8.4	215	8.9
2	4	2.8	14	2.7	11	2.4	3	0.7	4	1.6			1	0.5	7	1.9	44	1.8
Low 1	1	0.7	3	0.6	5	1.1	5	1.2	2	0.8	1	1.0	2	1.0	4	1.1	23	0.9
Totals	144	99.8	516	100.0	466	100.0	405	100.0	248	100.0	98	99.9	200	100.0	370	100.0	2447	100.0

Staff Cooperation

A cooperative staff was considered of high importance by 57.3 percent of the teachers (Table 251). Another 30.7 percent ranked it at the four level. Means ranged from 4.4 in the Great Lakes Region to 4.5 in New England and the Farwest.

TABLE 251

FREQUENCY DISTRIBUTION OF IMPORTANCE OF A COOPERATIVE STAFF FOR A HIGH QUALITY SCIENCE PROGRAM AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 143		N = 512		N = 459		N = 403		N = 247		N = 97		N = 198		N = 369		N = 2428	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	87	60.8	298	58.2	263	57.3	236	58.6	114	46.2	57	58.8	113	57.1	224	60.7	1392	57.3
4	43	30.1	151	29.5	139	30.3	115	28.5	103	41.7	27	27.8	64	32.3	104	28.2	746	30.7
3	8	5.6	47	9.2	42	9.1	42	10.4	22	8.9	10	10.3	16	8.1	34	9.2	221	9.1
2	3	2.1	7	1.3	6	1.3	9	2.2	6	2.4	3	3.1	4	2.0	5	1.4	43	1.8
Low 1	2	1.4	9	.8	9	2.0	1	0.2	2	0.8			1	0.5	2	0.5	26	1.1
Totals	143	100.0	512	100.0	459	100.0	403	99.9	247	100.0	97	100.0	198	100.0	369	100.0	2428	100.0

Small Classes

The importance of small classes for obtaining and maintaining a quality science program was considered of high importance by 55.5 percent of the teachers (Table 252). Importance at the four level was indicated by 31.6 percent and at level three by another 10.2 percent of the teachers. Means varied from 4.10 in importance in the Southwest to 4.52 in the Southeast Region.

TABLE 252

FREQUENCY DISTRIBUTION OF IMPORTANCE OF SMALL CLASSES FOR A HIGH QUALITY SCIENCE PROGRAM AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 144		N = 516		N = 466		N = 405		N = 248		N = 97		N = 198		N = 369		N = 2445	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	78	54.2	286	55.4	240	51.5	261	64.4	119	48.0	52	53.6	111	56.0	209	56.6	1365	55.5
4	53	36.8	158	30.6	164	35.2	105	25.9	77	31.0	34	35.1	64	32.0	117	31.7	772	31.6
3	12	8.3	55	10.7	48	10.3	31	7.7	37	14.9	11	11.3	21	10.6	35	9.5	250	10.2
2			12	2.3	9	1.9	5	1.2	11	4.4			4	2.0	6	1.6	47	1.9
Low 1	1	0.7	5	1.0	5	1.1	3	0.7	4	1.6					2	0.5	20	0.8
Totals	144	100.0	516	100.0	466	100.0	405	99.9	248	99.9	97	100.0	198	100.0	369	99.9	2445	100.0

Lighter Teaching Loads

Rank of importance of lighter teaching loads for having a high quality science program was marked highest by 38.8 percent of the teachers (Table 253). Another 36.9 percent indicated it was four on the scale while 18.5 percent gave it third place in importance. The means of the regions varied from 3.9 in the Plains to 4.3 on the scale of importance in the Southeast Region.

TABLE 253

FREQUENCY DISTRIBUTION OF IMPORTANCE OF LIGHTER TEACHING LOADS FOR A HIGH QUALITY SCIENCE PROGRAM AS RANKED BY TEACHERS BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 140		N = 509		N = 453		N = 391		N = 244		N = 94		N = 191		N = 360		N = 2382	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	54	38.6	188	36.9	154	34.0	190	48.6	77	31.6	33	35.1	75	39.3	153	42.5	924	38.8
4	54	38.6	189	37.1	179	39.5	141	36.1	96	39.3	31	33.0	70	36.6	119	33.1	879	36.9
3	28	20.0	102	20.0	90	19.9	42	10.7	47	19.3	27	28.7	36	18.8	68	18.9	440	18.5
2	2	1.4	19	3.7	21	4.6	11	2.8	19	7.8	2	2.1	4	2.1	13	3.6	91	3.8
Low 1	2	1.4	11	2.2	9	2.0	7	1.8	5	2.0	1	1.1	6	3.1	7	1.9	48	2.0
Totals	140	100.0	509	99.9	453	100.0	391	100.0	244	100.0	94	100.0	191	99.9	360	100.1	2382	100.0

Number of Subject Preparations

Of the 2,416 teachers checking this item 50.6 percent ranked it high in importance for a quality science program (Table 254). It was ranked four in importance by 34.1 percent of the teachers. Again the means of importance only varied from 4.2 in the Mideast to 4.4 in the Farwest Region.

TABLE 254

FREQUENCY DISTRIBUTION OF IMPORTANCE OF THE NUMBER OF DIFFERENT SUBJECT PREPARATIONS FOR A HIGH QUALITY SCIENCE PROGRAM AS RANKED BY TEACHERS BY REGIONS

	New England N = 142		Mideast N = 510		Great Lakes N = 456		Southeast N = 397		Plains N = 246		Rocky Mountains N = 98		Southwest N = 197		Farwest N = 365		Total U.S. N = 2416	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	62	43.7	247	48.4	240	52.6	202	50.9	116	47.2	44	44.9	102	51.8	204	56.5	1222	50.6
4	65	45.8	166	32.5	150	32.9	137	34.5	90	36.6	38	38.8	64	32.5	115	31.1	825	34.1
3	10	7.0	76	14.9	45	9.9	34	8.5	32	13.0	13	13.2	19	9.6	34	9.2	263	10.9
2	3	2.1	15	2.9	14	3.1	9	2.3	5	2.0	3	3.1	8	4.1	6	1.6	63	2.6
Low 1	2	1.4	6	1.2	7	1.5	15	3.8	3	1.2			4	2.0	6	1.6	43	1.8
Totals	142	100.0	510	99.9	456	100.0	397	100.0	246	100.0	98	100.0	197	100.0	365	100.0	2416	100.0

Innovative Science Curricula

The importance of innovative science curricula in obtaining and maintaining a quality science prograr was ranked high by 55.0 percent of the teachers (Table 255). Another 27.7 percent ranked it four on the scale. Means of importance only ranged from 4.2 in the Southeast to 4.4 in the Farwest.

TABLE 255

FREQUENCY DISTRIBUTION OF IMPORTANCE OF INNOVATIVE SCIENCE CURRICULA FOR A HIGH QUALITY SCIENCE PROGRAM AS RANKED BY TEACHERS BY REGIONS

	New England N = 141		Mideast N = 512		Great Lakes N = 467		Southeast N = 404		Plains N = 245		Rocky Mountains N = 97		Southwest N = 198		Farwest N = 365		Total U.S. N = 2429	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	76	53.9	286	55.8	254	54.4	212	52.5	127	51.8	58	59.8	103	52.0	220	60.3	1336	55.0
4	38	26.9	143	27.9	129	27.6	108	26.7	78	31.8	27	27.8	51	25.8	99	27.1	673	27.7
3	19	13.5	64	12.5	62	13.3	67	16.6	31	12.7	12	12.4	35	17.7	33	9.0	323	13.3
2	8	5.7	16	3.1	19	4.1	12	3.0	5	2.0			9	4.5	8	2.2	77	3.2
Low 1			3	0.6	3	0.6	5	1.2	4	1.6					5	1.4	20	0.8
Totals	141	100.0	512	99.9	467	100.0	404	100.0	245	99.9	97	100.0	198	100.0	365	100.0	2429	100.0

In-Service Education

In-service education as an important factor in having a high quality science program was ranked highest by 29.9 percent of the teachers (Table 256). Another 31.7 percent marked it four, or second in importance, while 25.0 percent gave it third place on the scale. Means of importance ranged from 3.5 in the Mideast to 4.1 in the Rocky Mountains Region.

TABLE 256

FREQUENCY DISTRIBUTION OF IMPORTANCE OF INSERVICE EDUCATION FOR A HIGH QUALITY SCIENCE PROGRAM AS RANKED BY TEACHERS BY REGIONS

	New England N = 141		Mideast N = 512		Great Lakes N = 454		Southeast N = 401		Plains N = 246		Rocky Mountains N = 97		Southwest N = 196		Farwest N = 366		U.S. Total N = 2413	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	44	31.2	131	25.6	136	30.0	146	36.4	70	28.5	40	41.2	53	27.0	101	27.6	721	29.9
4	49	34.8	134	26.2	159	35.0	113	28.2	85	34.5	35	36.1	64	32.7	127	34.7	766	31.7
3	30	21.3	149	29.1	106	23.3	101	25.2	63	25.6	16	16.5	50	25.5	89	24.3	604	25.0
2	14	9.9	62	12.1	34	7.5	22	5.5	18	7.3	5	5.2	16	8.2	27	7.4	198	8.2
Low 1	4	2.8	36	7.0	19	4.2	19	4.7	10	4.1	1	1.0	13	6.6	22	6.0	124	5.1
Totals	141	100.0	512	100.0	454	100.0	401	100.0	246	100.0	97	100.0	196	100.0	366	100.0	2413	99.9

Teacher's Salary

Of the sample teachers, 25.7 percent marked this item as five, 32.6 percent ranked it four on the scale of importance (Table 257). Another 26.2 percent marked it third in importance for having a high quality science program. Means among the regions show a low of 3.5 in the Rocky Mountains and a high of 3.7 in the Southwest and Plains.

TABLE 257

FREQUENCY DISTRIBUTION OF IMPORTANCE OF TEACHER'S SALARY FOR A HIGH QUALITY SCIENCE PROGRAM AS RANKED BY TEACHERS BY REGIONS

	New England N = 144		Mideast N = 510		Great Lakes N = 460		Southeast N = 406		Plains N = 248		Rocky Mountains N = 96		Southwest N = 198		Farwest N = 370		U.S. Total N = 2432	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	38	26.4	131	25.7	112	24.3	115	28.3	62	25.0	23	23.9	59	29.8	85	23.0	625	25.7
4	47	32.6	156	30.6	156	33.9	129	31.8	98	39.5	26	27.1	57	28.8	123	33.2	792	32.6
3	39	27.1	133	26.1	116	25.2	97	23.9	57	23.0	35	36.5	55	27.8	104	28.1	636	26.2
2	14	9.7	49	9.6	44	9.6	33	8.1	16	6.5	4	4.2	18	9.1	35	9.5	213	8.7
Low 1	6	4.2	41	8.0	32	6.9	32	7.9	15	6.0	8	8.3	9	4.5	23	6.2	166	6.8
Totals	144	100.0	510	100.0	460	99.9	406	100.0	248	100.0	96	100.0	198	100.0	370	100.0	2432	100.0

Satisfaction with Science Teaching as a Career

Teachers were asked to rate their satisfaction with science teaching as a career. On a five point scale, 56.3 percent ranked it highest (Table 258). Another 36.5 percent ranked it next high while only 4.7 percent ranked their satisfaction at the middle of the scale. Only 2.4 percent of all the teachers marked their satisfaction as below the middle of the scale. Means varied from 4.32 in the Plains to 4.56 in the Great Lakes Region. The sample of 2,446 teachers responding to this item on the questionnaire seem to be well satisfied with science teaching as a career.

TABLE 258

FREQUENCY DISTRIBUTION OF TEACHERS RANKING OF THEIR SATISFACTION WITH SCIENCE TEACHING AS A CAREER BY REGIONS

	New England		Mideast		Great Lakes		Southeast		Plains		Rocky Mountains		Southwest		Farwest		Total U.S.	
	N = 143		N = 518		N = 466		N = 410		N = 247		N = 97		N = 198		N = 367		N = 2446	
Importance	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High 5	81	56.6	317	21.2	292	62.7	200	48.8	110	44.5	49	50.5	112	56.5	217	59.1	1378	56.3
4	49	34.3	165	31.9	149	32.0	174	42.4	111	44.9	42	43.3	73	36.9	131	35.7	894	36.5
3	9	6.3	22	4.2	16	3.4	24	5.9	21	8.5	2	2.1	10	5.1	12	3.3	116	4.7
2	3	2.1	11	2.1	8	1.7	11	2.7	4	1.6	4	4.1	3	1.5	7	1.9	51	2.1
Low 1	1	0.7	3	0.6	1	0.2	1	0.2	1	0.4							7	0.3
Totals	143	100.0	518	100.0	466	100.0	410	100.0	247	99.9	97	100.0	198	100.0	367	100.0	2446	99.9
$\bar{x}$	4.44		4.51		4.56		4.37		4.32		4.38		4.48		4.52			
SD	0.76		0.76		0.67		0.74		0.73		0.73		0.67		0.66			

Section IV

Summary and Discussion

The purpose of this study was to obtain information about procedures, practices, policies, and conditions related to the teaching of science in the public secondary schools of the U.S. in 1971.

School Organization and Size

About 70 percent of the schools reporting were high schools or six year secondary schools. About 19 percent of the schools were junior high schools. The large majority of the students, over 70 percent, were students in these schools. Most of the schools, nearly 80 percent, had enrollments between 500 and 2,000 students. Relatively few schools had enrollments of under 500. These data were expected due to the sampling procedure of selecting students based on location of population.

School Schedules

The large majority of the schools are on daily schedules, using periods. Less than 10 percent have modular schedules or other scheduling arrangements. The usual day is a six or seven period day divided into periods of 45-60 minutes.

Financial Support of Science Instruction

While most schools, primarily the larger ones, have budgets for purchasing science equipment and materials many do not. Many remarked they do not have sufficient funds for purchase of supplies. Most common budgets reported were from one to three dollars per student per year. Those schools that have used ESEA and NDEA funds seemed to have less concern about adequacy of equipment.

Homogeneous Grouping

About half of the schools reported grouping students for some science instruction. This occurred most frequently in grades 7, 8, 9, and 10. Teacher recommendations and previous grades were the two most common sources of data used for making decisions. Student interest was ranked relatively low. Grouping was more common in larger schools.

Enrollments in Science Courses

While enrollments in general science are decreasing, a very large number of students are still taking such courses, particularly students

in grades 7, 8, 9, and 10. Two common course patterns are evident for junior high schools that have discontinued general science. These are life science, grade 7, physical science, grade 8, and earth science, grade 9, and physical science, grade 7, earth science, grade 8, and life science or biology, grade 9.

The most common courses in grades 10, 11, and 12 are biology, chemistry, physical science, and physics. Biology is still the most common course completed by students and appears to be the last science course completed by more than half the students. While the number of students who take chemistry is quite sizeable, the number who enroll in physics appears to be quite small. Several schools indicated they offer physical science as an alternative to chemistry and physics; the data indicate many students are using this option.

While a number of schools offered advanced classes or honor classes for able students, those schools with such programs were primarily larger schools. Hence, a small sample of the schools account for many of the honors courses.

Materials developed with funds from the National Science Foundation were used by over 50 percent of the schools. IPS and ESCP were the most common project materials used in the junior high school. Approximately 50 percent of the high schools were using BSCS materials, while CHEMS and PSSC were used in over 30 percent of the schools. Project Physics was being used in about 12 percent of the schools, a surprisingly high number considering the length of time the materials had been available. Larger schools reported more use of NSF sponsored materials.

Environmental/Conservation Education (EE) was being emphasized by about 63 percent of the schools. The most common approach was teaching EE with science. Some efforts to integrate EE with social studies and with other courses were reported. While most schools did not have facilities for environmental education, those that did stressed EE more in their program. In most instances, having facilities is probably the result of having active environmental/conservation education programs.

Use of Supervisors and Consultants

Approximately 36 percent of the schools had city or county supervisors available. About 70 percent of these staff members were science specialists. About 25 percent of the schools indicated use of state department supervisors and college or university consultants. State department personnel were used most frequently for workshops and college and university personnel for workshops and curriculum development projects.

Personal Characteristics of the Teachers

The teachers who were selected to respond to the questionnaire averaged between 35 and 39 years of age by region. This represents a higher mean age than reported in many previous studies. This may be at least partially due to the sample of large schools. The large majority of the teachers were male, though the number of females to males was considerably closer in the Southeast.

The age of the teachers was also reflected in the amount of education they had attained; over half had a graduate degree at the masters level or beyond. About 25 percent of the teachers were working at the time of the study on a higher degree.

In general, the teachers were adequately prepared for what they were teaching, although a number did not have broad preparation related to their teaching assignments. Preparation of teachers of the most common courses are briefly discussed below.

General Science teachers tended to have some depth in biology or physical science or a few courses in a number of areas. Relatively few had depth in more than one area. Most had very little formal course work in mathematics.

Earth Science teachers had the least preparation in their major area of any of the teachers. It appeared that many of them had been teaching some other subject and requested or were asked to teach earth science; it was not their major area of concentration of study. The large majority of these people also had little math preparation.

Biology teachers were generally well prepared in the biological sciences. A number had relatively little chemistry or physics preparation though the average preparation, about 20 semester hours, is considerably better than many teachers obtained about a decade ago. Most biology teachers had very little preparation in mathematics.

The large majority of the chemistry teachers had a reasonable course background in chemistry. While most also had some mathematics course work, a sizeable number had very little. Many of the chemistry teachers had studied physics for a year but relatively few had much more.

The physics course pattern was similar to the chemistry pattern except the major area of study was physics and the second area was chemistry.

It is difficult to summarize the preparation of physical science teachers. A sizeable number had very minimal preparation in the physical sciences, especially if they taught at the junior high level. Teachers at the senior high level generally had better preparation in the physical sciences. Most had relatively little course work in mathematics unless they also were teaching physics and chemistry.

It appears that careful consideration should be given to requiring more breadth in related science and in mathematics. Whether this can be done in a four year program or whether it will require a fifth year of study depends upon the curricula of the particular institution and the certification requirements of the state.

Attendance at National Science Foundation Institutes

Over half the teachers in this sample had attended NSF institutes. About nine percent of the teachers reported they had attended an Academic

Year Institutes, over 50 percent had attended NSF Summer Institutes, while many had attended both of these and/or others such as the NSF COOP inservice program and Research Institute program. Those who had attended such institutes were more likely to be using curriculum materials developed with NSF support, be using lab activities, and be stressing pupil centered activities. Similar findings have been reported elsewhere over the last 6 to 8 years.

Teaching Experience

While about 25 percent of the teachers had been teaching four years or less, the average teaching experience of the sample was between 10 and 11 years. Nearly all of this experience was at the secondary school level. Very few teachers had experience at the elementary level. The teachers had also been in their current districts for most of their teaching careers.

Special Facilities for Science

Data were reported regarding availability and use of science facilities. While many facilities available were not frequently used audio-tutorial labs, ventilated animal areas, greenhouses, and weather stations were. Land labs received more than average use also. If probability of being used is a criterion for purchase or construction of facilities, those listed merit consideration for schools that do not have them.

Audiovisual Equipment and Materials

Most teachers taught in schools that appeared to be relatively well equipped with AV equipment and materials. Use varied depending primarily on teaching style, availability of software to use with some of the equipment, condition of the equipment or materials, and relative ease of scheduling the equipment.

Importance of Learning Activities

Lecture-discussion was ranked as the most important teaching activity, followed by group laboratory, individual laboratory and demonstrations. Other procedures were ranked considerably lower.

Importance of Grading Methods

Test scores and performance on laboratory work were ranked highest. Those who stressed laboratory work as an activity generally believed it was also important as a grading method; there were, however, a number of exceptions. Several people who indicated laboratory work was an important activity did not rank laboratory performance as important for grading.

Factors Needed for a Quality Science Program

All of the factors listed were selected important or very important by over 50 percent of the teachers. This was expected because the items had been selected from teacher responses to previous questions of what they felt contributed to quality programs. Whether these variables actually predict a quality program has not been substantiated. Teachers, however, believe they do and how they perceive these will affect the teacher's morale.

Satisfaction with Teaching

The large majority of the sample teachers were very satisfied with science teaching as a career, though a few were not. While it is possible that science teachers in similar settings are this satisfied, the degree of satisfaction is higher than usually found. The reason for the high satisfaction is not clear.

A Last Comment

These data provide an estimate of secondary school science programs, instruction, and teachers during the 1970-71 year. A correlational study is also being published. A follow-up study for trend analysis is planned for the 1974-75 school year.

The data for the 1970-71 school year is on computer tape and may be used by permission. Send your inquiries to Dr. Robert Howe, 244 Arps Hall, The Ohio State University, Columbus, Ohio 43210.

A bibliography of related survey studies is provided as an insert to this publication.

APPENDIX A

Principal's Questionnaire

THE OHIO STATE UNIVERSITY
CENTER FOR SCIENCE AND MATHEMATICS EDUCATION
244 Arps Hall, 1945 North High Street
Columbus, Ohio 43210

SURVEY OF SCIENCE TEACHING IN PUBLIC SECONDARY SCHOOLS
1970-71

PRINCIPAL'S QUESTIONNAIRE

/ / / / / / / / / /

Name of Principal: _____

Name of School: _____

Address of School: _____
Number Street

_____ _____
City County

_____
State Zip Code

General Instructions:

This questionnaire is to be answered for an individual public secondary school, not for the school system at large. Please check over the questionnaire to get an idea of the scope of the questions asked before beginning to fill out the form. Check (✓) or fill every item that applies.

Definition:

For purposes of this survey a public secondary school is defined as " an educational institution, operated on public funds, under the principal or head teacher, including any combination of grade levels from 7 through 12, except any lower grades under an elementary school organization." This definition excludes all private, parochial or diocesan secondary schools, correctional schools, technical or vocational schools, and special schools for the blind, the partially blind, the deaf, dumb, emotionally-disturbed and physically or mentally-handicapped children.

I. SCREENING QUESTION

Is your school a public secondary school according to the above definition ?

_____ Yes (If checked, continue with item 1 of Section II.)

_____ No (If checked, indicate below what type of school yours is and disregard the rest of the questionnaire and mail it back to us.)

Type of School _____

II. SCHOOL ORGANIZATION AND SCHEDULING

1. Check the grade levels that are in the school(s) for which you are responsible.

K-12 _____	8-12 _____	7-8 _____
1-12 _____	9-12 _____	7-9 _____
7-12 _____	10-12 _____	Other _____ (specify)

2. Give the enrollment for each grade level in the school(s) for which you are responsible as of Fall, 1970. Give also the total school enrollment. If you do not have students in a particular grade level, please leave the corresponding space blank.

Grade Level	Enrollment	Grade Level	Enrollment
7	_____	10	_____
8	_____	11	_____
9	_____	12	_____

Total school enrollment _____

3a) Check the kind of scheduling that is used in your school.

Period _____ Modular _____ Other (specify) _____

b) Specify the number of regular class periods or modules per day

_____ periods/modules.

c) What is the length of a regular class period or module in minutes ? (Do not include the time for passing between classes.)

_____ minutes.

d) How many periods or modules per week are devoted to teaching science in each grade level ?

Grade Level	Periods/Modules per week	Grade Level	Periods/Modules per week
7	_____	10	_____
8	_____	11	_____
9	_____	12	_____

Combination of grades (specify)

_____ _____

4. What is the length of your regular school year ? (Number of days classes are in session.)

Number of days _____

III. GROUPING OF SCIENCE CLASSES

1a) Are science classes grouped homogeneously in your school ?

Yes _____ If yes, answer item 1b and 2 below.

No _____ If no, go on to item 1 of Section IV.

b) At what grade level(s) is homogeneous grouping for science classes generally done ?

Grade 7 _____ Grade 8 _____ Grade 9 _____

Grade 10 _____ Grade 11 _____ Grade 12 _____

All grades (7 through 12) _____

2. Please rank three of the following criteria in order of importance as the basis for the homogeneous grouping of science classes in your school. Use "1" for the criterion of greatest importance, "2" for the next most important, and "3" for the third most important criterion.

Criterion	Rank	Criterion	Rank
Marks or grades	_____	Teacher(s) recommendation	_____
Intelligence test(s)	_____	Parent(s) recommendation	_____
Aptitude test(s)	_____	Counsellor's recommendation	_____
Others (specify)		Student interest	_____
_____	_____		
_____	_____		

IV. TEACHING STAFF

For items 1 and 2 below, the following definitions apply:

Full-time teachers: those teachers who occupy teaching positions which require them to be on the job on school days, throughout the school year, at least the number of hours the schools in the system are in session.

Part-time teachers: those teachers who occupy teaching positions which require less than full-day service.

(Substitute teachers, defined as persons employed to teach on a day-to-day basis, temporarily replacing regularly employed teachers, are not considered as part-time teachers in this study.)

1. Specify the total number of regularly employed teachers (all subjects) in your school.

Sex	Number of Full-time Teachers	Number of Part-time Teachers
Male	_____	_____
Female	_____	_____

2. Specify the total number of regularly employed teachers who teach at least one science subject or course.

Sex	Number of Full-time Teachers who Teach Science	Number of Part-time Teachers who Teach Science
Male	_____	_____
Female	_____	_____

3. Please complete the table below to show how many of your science teachers have the following percent of their assignment teaching science.

Example
If you have 2 teachers who teach science 50 percent of the time, please write "2" in the space across from "41-60".

Percent of Teaching Assignment devoted to Teaching Science	Number of Teachers
0 - 20	_____
21 - 40	_____
41 - 60	_____
61 - 80	_____
81 - 100	_____

V. SCIENCE BUDGET

For items 1-6 below, the following definitions apply:

Equipment is defined as non-consumable, non-perishable items such as microscopes, chemical balances, models, telescopes, aquariums, etc.

Supplies are defined as perishable or easily breakable materials that must continually be replenished such as chemicals, dry cells, glassware, electric bulbs, copper wire, etc.

1. Does your school have an annual budget for the purchase of new science equipment ? Yes _____ No _____

If yes, amount of money spent or committed per student for 1970-71 (Please use the total school enrollment for computing this.)

$ _____

2. Does your school have an annual budget for the purchase of consumable supplies such as chemicals, batteries, etc ? Yes _____ No _____

If yes, amount of money spent or committed per student for 1970-71 (Please use the total school enrollment for computing this.)

$ _____

3. Are your science teachers permitted to purchase equipment and supplies periodically throughout the school year ? Yes _____ No _____

4. Have you used money from the National Defense Education Act (NDEA) since September 1968 to purchase new science equipment ?

Yes _____ No _____

5. Have you used money from the Elementary and Secondary Education Act (ESEA) since September 1968 to purchase new science equipment ?

Yes _____ No _____

6. Have you remodeled science facilities in your school with money from the National Defense Education Act (NDEA) since September 1968 ?

Yes _____ No _____

VI. COURSE OFFERINGS

1. Please specify the number of students by grade level(s) who are taking the following science courses in your school during the 1970-71 school year. If a particular course is not taught in your school, please leave the corresponding spaces blank.

Science Course	Number of Students by Grade Levels					
	7	8	9	10	11	12
General Science						
Life Science						
Biology						
Chemistry						
Physics						
Earth Science						
Geology						
Physical Science						
Health Science						
Others (specify)						
_____						
_____						
_____						
Combination of Courses (specify)						
_____						
_____						
_____						

2. Please specify the number of students by grade levels who are taking Science Course Improvement Projects taught in your school during the 1970-71 school year. If a particular course is not taught in your school, please leave the corresponding spaces blank.

Science Course Improvement Project	Number of Students by Grade Levels					
	7	8	9	10	11	12
Introductory Physical Science (IPS)						
Intermediate Science Curriculum Study (ISCS)						
Earth Science Curriculum Project (ESCP)						
Secondary School Science Project (SSSP)						
Biological Sciences Curriculum Study (BSCS)						
a) Blue Version						
b) Green Version						
c) Yellow Version						
Chemical Education Material Study (CHEMS)						
Chemical Bond Approach (CBA)						
Physical Science Study Committee (PSSC) Physics						
Harvard Project Physics (HPP)						
Others (specify)						
_____						
_____						

3. Please specify the number of students by grade levels in each of the Advanced Science Courses taught in your school during the 1970-71 school year. If a particular course is not taught in your school, please leave the corresponding spaces blank.

Advanced Science Course	Number of Students by Grade Levels					
	7	8	9	10	11	12
Honors Science Program						
Advanced Biology						
BSCS Second Course						
Advanced Chemistry						
Advanced Physics						
Advanced Topics (PSSC)						
Science Research Seminar						
Others (specify)						
_____						
_____						

4a) Is Environmental/ Conservation Education taught in your school ?

Yes _____ If yes, answer items 4b and 4c.

No _____ If no, go to item 1 of Section VII.

b) Is Environmental/ Conservation Education taught as a separate subject or in relation to other subjects ?
(Check in the appropriate space for each grade level.)

	Grade Level					
	7	8	9	10	11	12
Taught separately						
Taught with science						
Taught with social studies						
Integrated with two or more subjects including science						
Integrated with two or more subjects not including science						
Other (specify) _____						

c) Specify the facilities (such as an outdoor education laboratory, school farm, school forest ...) that are available for teaching Environmental/ Conservation Education in your school.

_____ _____

_____ _____

_____ _____

VII. MISCELLANEOUS

1. Does your school sponsor a science club ? Yes _____ No _____

2. Does your school sponsor a science fair ? Yes _____ No _____

3. Did your students take part in science fairs with students from other schools during the 1969-70 school year ? Yes _____ No _____

4. Which type of supervisors or consultants are used by science teachers in your school during the 1970-71 school year. If not used, check in the first column of the table below.

Affiliation of Supervisors or Consultants	Not Used	Science Specialist	General Curriculum Specialist
a) City/county supervisor or consultant			
b) State Department supervisor or consultant			
c) Consultant from college or university			

4. (Continued)

Affiliation of Supervisors or Consultants	Not Used	Science Specialist	General Curriculum Specialist
d) Resource teacher employed by school system for several schools			
e) Resource teacher employed by your school			
f) Local, professionally-trained people (eg., doctors, scientists, engineers...)			
g) Other (specify) _____			

5. What are the opportunities science teachers in your school have for in-service science education ? Check as many spaces as apply for each type of in-service activity for science teachers.

In-service Activities for Science Teachers	Local School Level	School System Level	State Level	College Sponsored	Any Other Sponsorship (specify)
a) Curriculum development and revision meetings					
b) Workshops devoted to science teaching methods					
c) College science content courses or workshops					
d) Television and/or radio programs for science teachers					
e) Others (specify) _____					
_____					
_____					

END OF THE PRINCIPAL'S QUESTIONNAIRE

THANK YOU FOR YOUR COOPERATION

APPENDIX B

Science Teacher Questionnaire

THE OHIO STATE UNIVERSITY
CENTER FOR SCIENCE AND MATHEMATICS EDUCATION
244 Arps Hall, 1945 North High Street
Columbus, Ohio 43210

SURVEY OF SCIENCE TEACHING IN PUBLIC SECONDARY SCHOOLS
1970-71

SCIENCE TEACHER QUESTIONNAIRE

/ / / / / / / / / /

Name of School: _____

Address of School: _____
Number Street

_____
City County

_____
State Zip Code

General Instructions:

This questionnaire is to be answered by the individual secondary school science teacher. Please check over the questionnaire to get an idea of the scope of questions asked before beginning to fill out the form. Check (✓) or fill every item that applies.

Definition:

For purposes of this survey, a secondary school science teacher is defined as "a teacher who teaches at least one science course or subject in any grade level or combination of grade levels from 7 through 12, in any school designated as a public secondary school."

I. SCHOOL ORGANIZATION

Check the grade levels that are included in your school.

K-12 _____	8-12 _____	7-8 _____
1-12 _____	9-12 _____	7-9 _____
7-12 _____	10-12 _____	Other _____ (specify)

II. TEACHER CHARACTERISTICS

Check (✓) or fill in the blank.

1. Age in years _____

2. Sex: male _____ female _____

3. Please check the degree(s) you now hold, and specify the major and minor subject matter fields of the degree(s).

Degree(s) Held	Subject Matter Fields	
	Major	Minor(s)
B.S. or B.A._____	_____	_____ _____
M.S. or M.A._____	_____	_____ _____
Ed.D._____	_____	_____ _____
Ph.D._____	_____	_____ _____
Specialist _____	_____	_____ _____
Non-degree _____	_____	_____ _____
Other (specify)__	_____	_____ _____

4. Are you now working on a formal degree program? Yes _____ No ____

If yes, what degree ? _____

Major subject matter field _____

Minor subject matter field(s)_____ _____

5. Please specify the number of credits you have in the following areas in <u>either</u> quarter hours <u>or</u> semester hours.

Undergraduate Work	Quarter Hours	Semester Hours
Biological Sciences	_____	_____
Physical Sciences	_____	_____
Earth Science	_____	_____
Mathematics	_____	_____
Science Teaching Methods	_____	_____
Student Teaching in Science	_____	_____
<u>Graduate Work</u>		
Biological Sciences	_____	_____
Physical Sciences	_____	_____
Earth Science	_____	_____
Mathematics	_____	_____
Science Teaching Methods or Science Education	_____	_____

6. If you have attended any sponsored In-service Institutes during the period 1960-70, please circle the year(s) in which you attended the institute(s). For example, if you attended a National Science Foundation (N.S.F.) Academic Year Institute in 1965-66, circle "65". If you have attended an In-service Institute during 1969-70, circle "69".

Kind of Institute											
N.S.F. Academic Year	60	61	62	63	64	65	66	67	68	69	70
N.S.F. In-service	60	61	62	63	64	65	66	67	68	69	70
N.S.F. Summer	60	61	62	63	64	65	66	67	68	69	70
N.S.F. Research	60	61	62	63	64	65	66	67	68	69	70
Other Sponsored Institutes (specify)											
_____	60	61	62	63	64	65	66	67	68	69	70
_____	60	61	62	63	64	65	66	67	68	69	70

7. If you teach or have taught one or more of the Science Course Improvement Projects (eg., IPS,ISCS,ESCP,SSSP, IME, BSCS, CHEM Study, CBA, PSSC, HPP, Portland Project ...), since September 1968, please supply the following information about each project.

Science Course Improvement Project	Attendance at Workshop or Institute Yes	No	Length of Workshop or Institute
_____	____	____	_____
_____	____	____	_____
_____	____	____	_____
_____	____	____	_____
_____	____	____	_____

The following definitions apply for item 8 below:

Full-time teachers: those teachers who occupy teaching positions which require them to be on the job on school days, throughout the school year for at least the number of hours the schools in the system are in session.

Part-time teachers: those teachers who occupy teaching positions which require less than full-day service.

Substitute teachers: those persons employed to teach on a day-to-day basis, temporarily replacing regularly employed teachers. They are not considered as part-time teachers in this study.

8. On what basis are you now employed by the school system ?

Full-time _____ As a substitute _____

Part-time _____ Other (specify) _____

9a) Number of years of teaching experience in an elementary school _____

b) Number of years of teaching experience in a secondary school (Include the present school year.) _____

c) Total number of years of teaching experience (Include the present school year.) _____

d) Number of years you have taught science in a secondary school (Include the present school year.) _____

e) Number of years at present school system or district (Include the present school year.) _____

III. TEACHING LOAD

Please list below all subjects or courses you are teaching, and fill in the related information.

Example

A teacher who teaches two sections of 10th grade BSCS Biology - Blue Version with 20 students in one section and 28 students in the other section would fill in the information as follows:

Subject/Course	Grade Level(s)	No. of Sections or Classes	Average Class Size
BSCS Blue Version	10	2	24

Subject/Course	Grade Level(s)	No. of Sections or Classes	Average Class Size

IV. SPECIAL SCIENCE FACILITIES AND AUDIO-VISUAL AIDS

1. Check the special science facility or facilities that is/are available for your use in teaching science in your school. How much use do you make of each facility that is available ?

Special Science Facility	Availability		Usage		
	Yes	No	Often (at least once a week)	Occasionally (about once a month)	Rarely (less than once a month)
Auto-tutorial laboratory					
Closed circuit television					
Computer terminal(s)					
Greenhouse					
Ham radio station					
Land laboratory					
Nature trail(s)					
Observatory					
Planetarium					
Science darkroom					
Ventilated animal house					
Weather station					
Other (specify) _____					

2. Check the audio-visual aids that are available to you in teaching science. How much use do you make of each kind of aid that is available ?

Audio-visual Aid	Availability		Usage		
	Yes	No	Often (at least once a week)	Occasionally (about once a month)	Rarely (less than once a month)
Motion picture projector					
Filmloop projector					
Slide projector					
Overhead projector					
Opaque projector					
Micro-projector					
Phonograph					
Tape-recorder					
Television					
Commercial models (eg.eye ear, molecular models...)					
Commercial charts					

V. SCIENCE TEACHING

Special Instruction

Items 1,2,3,4 and 5 below have been designed to provide information specific to one science class. If you teach only one class of science, respond to these same items with respect to that class. You may skip directly to item 1 below. If you teach more than one science class, please read the following before you begin item 1.

In order to ensure that the secondary school science classes in this survey constitute a random sample, we request your cooperation in selecting one of your science classes, about which we hope to obtain specific information regarding the science teaching practices.

The method of selecting this science class from all your science classes is outlined below. In selecting a science class for the information needed in Section V, Items 1-5, of the questionnaire, treat each group of students or unit as a separate class.

A. Order your science classes in numerical order, starting with "1" for the first science class that you teach each day, "2" for your second science class, and so on, ending with your last science class for the day.

B. Please select one of the science classes according to the following selection criteria:

Science Class Selection Numbers

04
03
02
01

a) If the total number of science classes that you teach is greater than or equal to 4, select the 4th science class.

b) If the total number of science classes that you teach is 3, select the 3rd science class.

c) If the total number of science classes that you teach is 2, select the 2nd science class.

V. SCIENCE TEACHING (Continued)

1. Title of science course _____

   Grade level(s) _____ Class size _____

2. Please check the kind of room that you use to conduct the science class specified above.

   Laboratory or special science room _____

   Classroom with portable science kits _____

   Classroom with no science facilities or kits _____

   Other (specify) _____

   _____

3a) Please specify the kind of curriculum materials and/or textbooks that you use for the science class specified above. Check as many as applies.

   Single textbook _____

   Separate laboratory manual _____

   Single textbook including laboratory manual _____

   Multiple textbooks _____

   Multiple textbooks including laboratory manual _____

   Locally-prepared materials _____

   Other (specify) _____

   _____

b) Please supply the following information about the textbook(s) and/or curriculum materials used for the science class specified above. If space is insufficient, please continue on the back of this sheet or attach a separate list.

Title	Publisher	Publication Date

4. With respect to the science class specified above, rank the three learning activities that you use most often. Use "1" for the most often used activity, "2" for the next most often, and "3" for the third most often used activity. Mark all other activities which you use with a check (✓).

Lecture	_____	Individual laboratory activity	_____
Lecture-discussion	_____	Group laboratory activity	_____
Small group discussion	_____	In-class written assignments	_____
Science demonstrations	_____	Excursions or field studies	_____
Instructional films	_____	Programed instruction	_____
Independent study	_____	Auto-tutorial instruction	_____
Others (specify)	_____	Televised instruction	_____

_____

_____

5. With respect to the science class specified above, rank the three grading methods that you use the most often. Use "1" for the most often used grading method, "2" for the next most often, and "3" for the third most often used grading method. If you do not use a particular grading method, please leave the corresponding space blank.

Grading Method	Rank
Test scores	_____
Written assignments	_____
Student participation in class discussion	_____
Student performance in laboratory activity	_____
Student performance in science projects	_____
Student interest in science	_____
Other (specify) _____	_____

VI. MISCELLANEOUS

1. Evaluate the importance of the following factors to you in obtaining and maintaining a high quality science program in your school.

Factors	Very Important 1	2	3	4	Not Important 5
Innovative science programs	_____	_____	_____	_____	_____
Administrative support	_____	_____	_____	_____	_____
Science facilities	_____	_____	_____	_____	_____
Teacher's salary	_____	_____	_____	_____	_____

1. (Continued)

Factors	Very Important 1	2	3	4	Not Important 5
In-service education					
Cooperative staff					
Small classes					
Number of different subject preparations					
Lighter teaching loads					
Others (specify)					
_____					
_____					

2. How satisfied are you with teaching science as a career ? Mark one of the spaces below with a check (✓).

Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied

END OF THE SCIENCE TEACHER QUESTIONNAIRE

THANK YOU FOR YOUR COOPERATION